363

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CONTENTS

TRADE NAME	MODEL	SET AND FOLDER No.
Admiral	Ch. 17Z3D, DB, DBM, DBN, DC, DCB, DF, DFB, DT, DTB Tel. Rec.	363-2
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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 7 IN SET 347

MAGNAVOX CHASSIS U21-01AA, U21-01BB, U21-02AA, U21-02BB, U21-03AA, U21-03BB, U21-04AA, U21-04BB, U21-05AA, U21-05BB, U21-06BB, U21-07BB, U21-08BB, U21-09BB, V21-01AA, V21-01BB, V21-02AA, V21-02BB, V-21-03AA, V21-03BB, V21-04AA, V21-04BB, V21-05AA, V21-05BB, V21-06BB, V21-07BB, V21-08BB, V21-09BB (21 Series)

Magnavox Chassis U21-01AA, U21-02AA, U21-03AA, U21-04AA, V21-01AA, V21-02AA, V21-03AA and V21-04AA (21 Series) were covered in Photofact Folder 7 - Set 347.

Chassis U21-01BB, U21-02BB, U21-03BB, U21-04BB, U21-05AA, U21-05BB, U21-06BB, U21-07BB, U21-08BB, U21-09BB, V21-01BB, V21-02BB, V21-03BB, V21-04BB, V21-05AA, V21-05BB, V21-06BB, V21-07BB, V21-08BB and V21-09BB (21 Series) are added, along with late production changes, with the publication of this bulletin.

The following changes apply to all chassis mentioned above.

COMPONENT CHANGES

T1, power transformer, is changed to part #300093-1.

T3, horizontal output transformer, is changed to part #360700-1.

T6, width coil, is changed to part #360699-1.

T7, audio output transformer, is changed to part #320276-1.

M1, selenium diode is changed to part #530045-2.

M7, detector assembly, is changed to part #360643-1.

Ch. U21-05BB, U21-06BB, U21-07BB, V21-05BB, V21-06BB, V21-07BB,

NEW AUDIO CIRCUIT

The audio circuit in chassis U21-05BB, U21-06BB, U21-07BB, V21-05BB, V21-06BB and V21-07BB incorporate a phono input circuit and a voltage divider circuit. A partial schematic is given in Fig. 1 showing the new audio circuit.

Ch. U21-01BB, U21-02BB, U21-03BB, U21-04BB, U21-05BB, U21-06BB, U21-07BB, U21-08BB, U21-09BB, V21-01BB, V21-02BB, V21-03BB, V21-04BB, V21-05BB, V21-06BB, V21-07BB, V21-08BB, V21-09BB

COMPONENT CHANGES

When the tuner is mounted away from the chassis, C29 is omitted and a 32 inch length of cable (Part # 467837-6) is connected from C18 to L8.

R72 is decreased from 11K to 6800Ω and is disconnected from ground. A 3900Ω, $\frac{1}{2}$ watt resistor is wired in series with R72 to ground. The junction of pin 2, V18 and C59 is connected to the junction of R72 and the added resistor.

R74 and R75 are decreased from 300Ω to 270Ω.

R89 is increased from 1500Ω to 3300Ω.

R88 is decreased from 12K to 8500Ω.

R91 is decreased from 6800Ω to 2700Ω.

K1, vertical integrator, is replaced by individual components. A partial schematic is given in Fig. 2 showing the new vertical integrator circuit.

L16, quadrature coil, is changed to part #360651-2.

R68 is increased from 1.2Meg to 2Meg.

PRODUCTION CHANGES
BULLETIN 187

PRODUCTION CHANGES
BULLETIN 187

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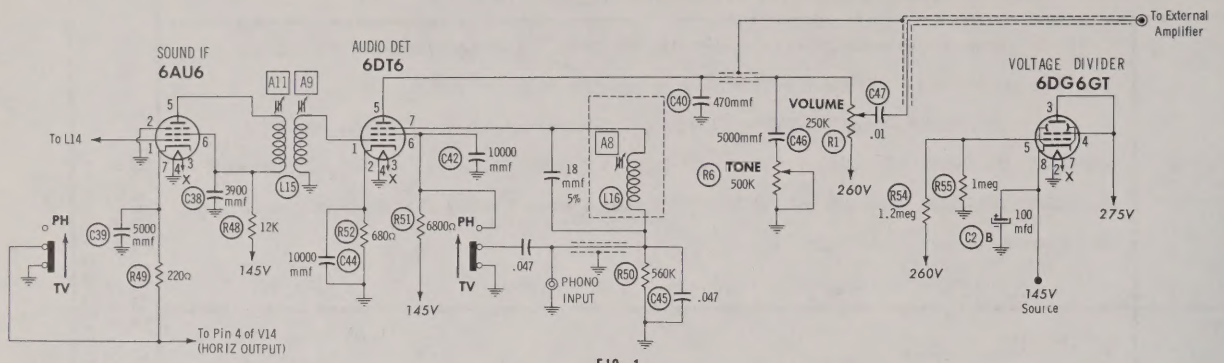

SOUND IF
6AU6
AUDIO DET
6DT6
VOLTAGE DIVIDER
6DG6GT
To External Amplifier
To L14
A11
A9
A8
L15
L16
C38 3900 mmf
C39 5000 mmf
C40 470mmf
C42 10000 mmf
C44 10000 mmf
C45 .047
C46 5000mmf
C47 .01
R1 VOLUME 250K
R6 TONE 500K
R48 12K
R49 220Ω
R50 560K
R51 6800Ω
R52 680Ω
R54 1.2meg
R55 1meg
C2 B 100 mfd
18 mmf 5%
.047
PH
TV
PHONO INPUT
145V
260V
275V
145V Source
To Pin 4 of V14 (HORIZ OUTPUT)

FIG. 1

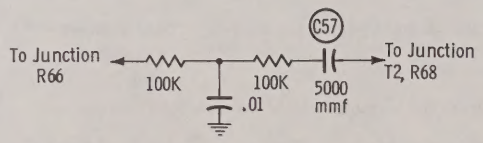

To Junction R66
100K
100K
.01
C57
5000 mmf
To Junction T2, R68

FIG. 2

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 16 IN SET 351

SILVERTONE MODELS 7045A, 7046A (Ch. 528.47210)

Silvertone Models 7045, 7046 (Ch. 528.47200) were covered in Photofact Folder 16 - Set 351.

Models 7045A and 7046A (Ch. 528.47210) are electrically identical to the models covered except for the following changes.

COMPONENT CHANGES

L2, oscillator coil, is changed to part #10-1-4.

L3, input IF, is changed to part # 10-42-2.

L4, output IF, is changed to part #10-41-2.

NEW PHASE INVERTER TUBE

V4, phase inverter, is changed from a 12AT6 to a 12BF6. A partial schematic showing the new circuit is given on the reverse side.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 11 IN SET 347

PHILCO MODEL T-7

Philco Model T-7 was covered in Photofact Folder 11 - Set 347.

During late production, the following production changes were made.

Code 126

COMPONENT CHANGES

C4 is decreased from 20000MMF to 10000MMF.

R7 is decreased from 4700Ω to 680Ω.

R8 is omitted.

R9 is decreased from 2200Ω to 820Ω.

R10 is decreased from 3300Ω to 820Ω.

C8 is decreased from 47MMF to 12MMF.

C11 is decreased from 12MMF to 8MMF.

R19 is increased from 390Ω to 470Ω.

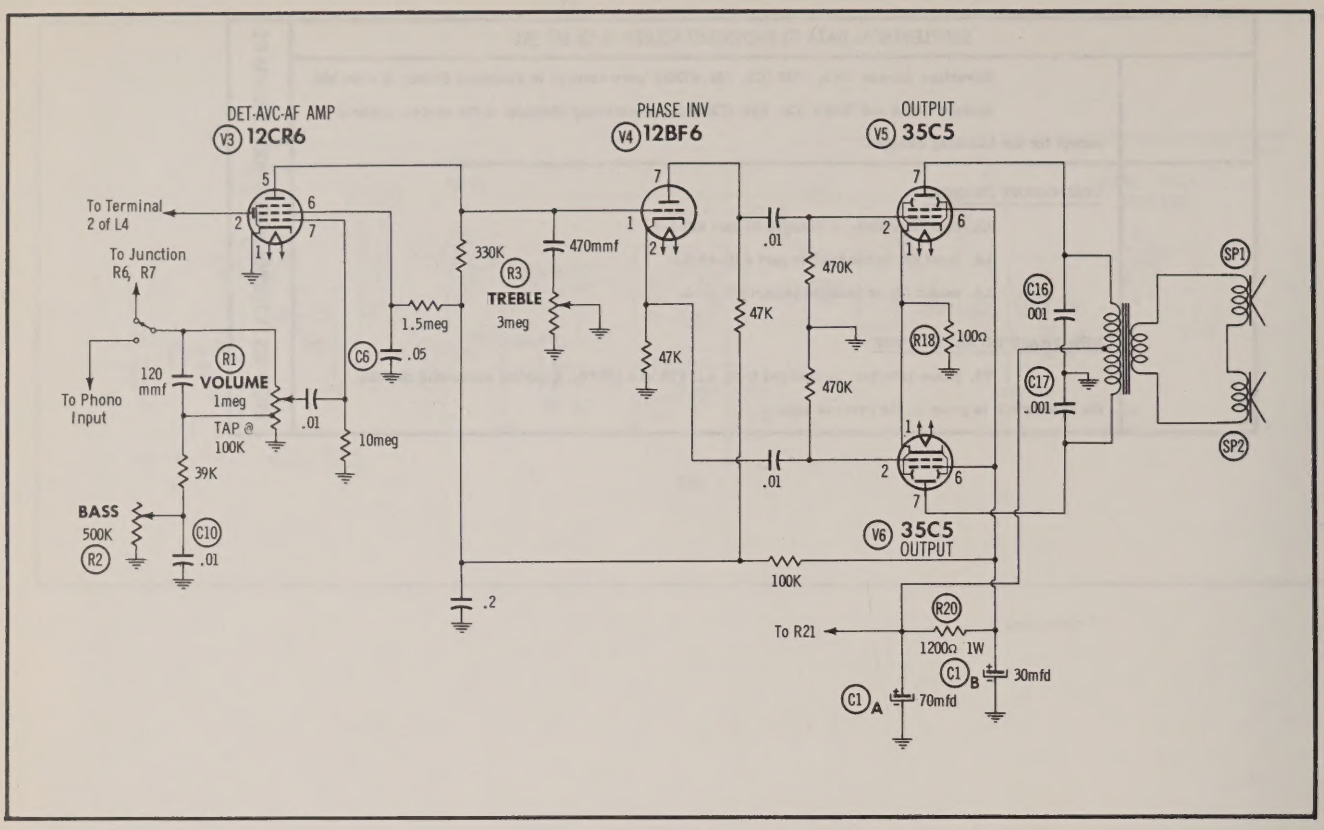
R24 is increased from 180Ω to 270Ω.

L4, 1st. IF transformer, is changed to part #32-4708-4.

L5, 2nd. IF transformer, is changed to part #32-4708-5.

L6, 3rd. IF transformer, is changed to part #32-4708-6.

X5, AF Amplifier, is changed from type L-5021L to type S-1001.

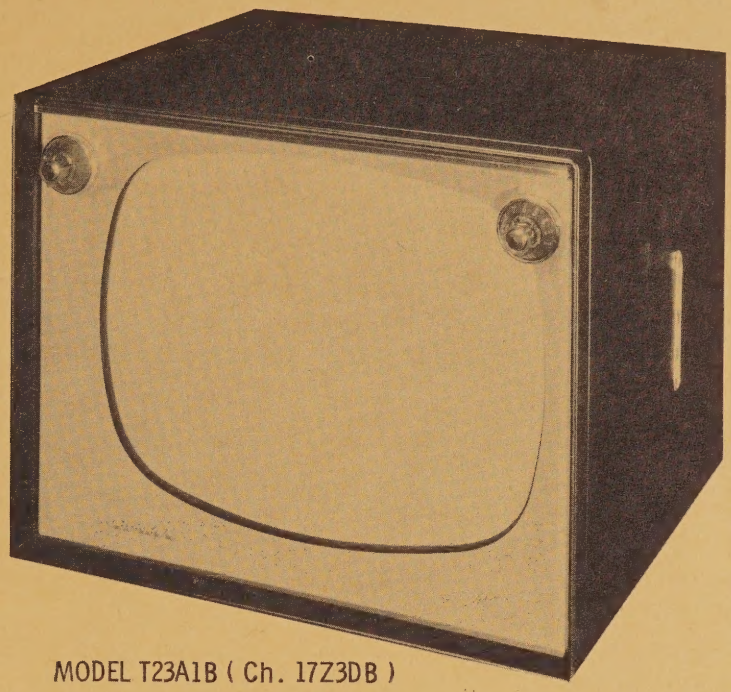

DET-AVC-AF AMP
V3 12CR6
PHASE INV
V4 12BF6
OUTPUT
V5 35C5
To Terminal 2 of L4
To Junction R6, R7
To Phono Input
R1
VOLUME
1meg
TAP @ 100K
120 mmf
.01
10meg
C6 .05
1.5meg
39K
BASS
500K
R2
C10 .01
330K
R3
TREBLE
3meg
470mmf
47K
.01
470K
470K
47K
.01
V6 35C5
OUTPUT
100K
.2
R18 100Ω
C16 001
C17 .001
SP1
SP2
R20
To R21
1200Ω 1W
C1B 30mfd
C1A 70mfd

ADMIRAL CHASSIS 17Z3D, DB, DBM, DBN, DC, DCB, DF, DFB, DT, DTB

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



MODEL T23A1B (Ch. 17Z3DB)

TRADE NAME	Admiral	MODELS	CHASSIS
		T23A1, T23A2, T23A3	17Z3D
		C23A26, C23A27	17Z3DC
		C23A11, C23A12, C23A13, T23A6, T23A7	17Z3DT
		C23A1C, C23A2C, C23A3C, C23A11B, C23A12B, C23A13B, C23A26B, C23A27B, C23B16C, C23B17C, C23B16CB, C23B17CB, T23A1B, T23A2B, T23A3B, T23A6B, T23A7B	17Z3DB, 17Z3DBM, 17Z3DBN, 17Z3DCB, 17Z3DF, 17Z3DFB, 17Z3DTB

MANUFACTURER	Admiral Corp., 3800 W. Cortland St., Chicago 47, Illinois
TYPE SET	Television Receiver
TUBES	Sixteen
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 135 Watts, 1.1 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, Video IF 25.75MC, Sound IF 21.25MC (Intercarrier)

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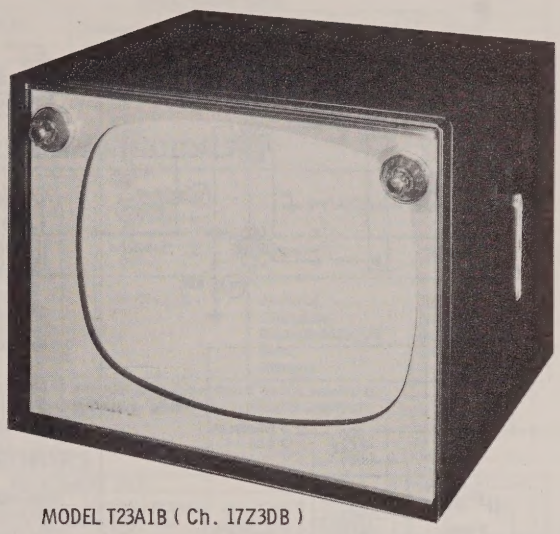
DATE 7-57 SET 363 FOLDER 2

ADMIRAL CHASSIS 17Z3D, DB, DBM, DBN, DC, DCB, DF, DFB, DT, DTB

ADMIRAL CHASSIS 17Z3D, DB, DBM, DBN, DC, DCB, DF, DFB, DT, DTB



MODEL T23A1B (Ch. 17Z3DB)

MODELS	CHASSIS
T23A1, T23A2, T23A3	17Z3D
C23A26, C23A27	17Z3DC
C23A11, C23A12, C23A13, T23A6, T23A7	17Z3DT
C23A1C, C23A2C, C23A3C, C23A11B, C23A12B, C23A13B, C23A26B, C23A27B, C23B16C, C23B17C, C23B16CB, C23B17CB, T23A1B, T23A2B, T23A3B, T23A6B, T23A7B	17Z3DB 17Z3DBM 17Z3DBN 17Z3DCB 17Z3DF 17Z3DFB

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from the front.
2. Remove 7 metal screws and the rear cover.
3. Remove 2 screws and the side escutcheon.
4. Remove 2 metal screws holding the side control panel.
5. Remove the picture tube socket, ion trap, yoke clamp, speaker plug and HV lead.
6. Remove the on-off-volume and contrast control by depressing 2 spring clips.
7. Remove 2 metal screws and AC interlock.
8. Remove 1 metal screw from the top chassis brace.
9. Remove 4 chassis bolts from the bottom.
10. Remove the chassis.
11. Remove 2 hex nuts and the speaker. NOTE: The speaker has the audio output transformer mounted and the plug has a jumper for completing the AC line to chassis.

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the channel selector and fine tuning knobs. Set the fine tuning at the center of its range. The adjustments are accessible, one at a time, as the channel selector is rotated. Adjust for best picture and sound.
NOTE: If 2 adjustments appear use the upper adjustment.

PICTURE TUBE SAFETY GLASS CLEANING

1. Remove 4 push-on type control knobs from the front.

2A. MODELS WITH REMOVABLE UPPER MOLDING
Remove the screws and molding at the top of the safety glass. Pull glass out at top and up to remove from the lower channel.

2B. MODELS WITH FRAME FRONT
Remove the screws from the bottom of the frame. Carefully pull the lower part of the frame outward and SLIGHTLY downward until it clears the channel at the top, continue outward and downward motion until the assembly clears the control shafts. NOTE: If this procedure is carefully followed it is NOT NECESSARY to remove the retaining discs behind the knobs or the lower retaining strip at the bottom of the glass.

FOCUS

The focus may be varied by the position of a strap on the base of the picture tube. The strap can be connected between pins 6 and 2 or 6 and 10. Readjust the ion trap for the best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

The horizontal frequency coil is used as the horizontal hold control. Adjust the horizontal hold until the picture synchronizes horizontally. (For location, see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the discriminator secondary (A8) located on the bottom of chassis.

FUSES

A 7.5Ω fusible resistor (R97) is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

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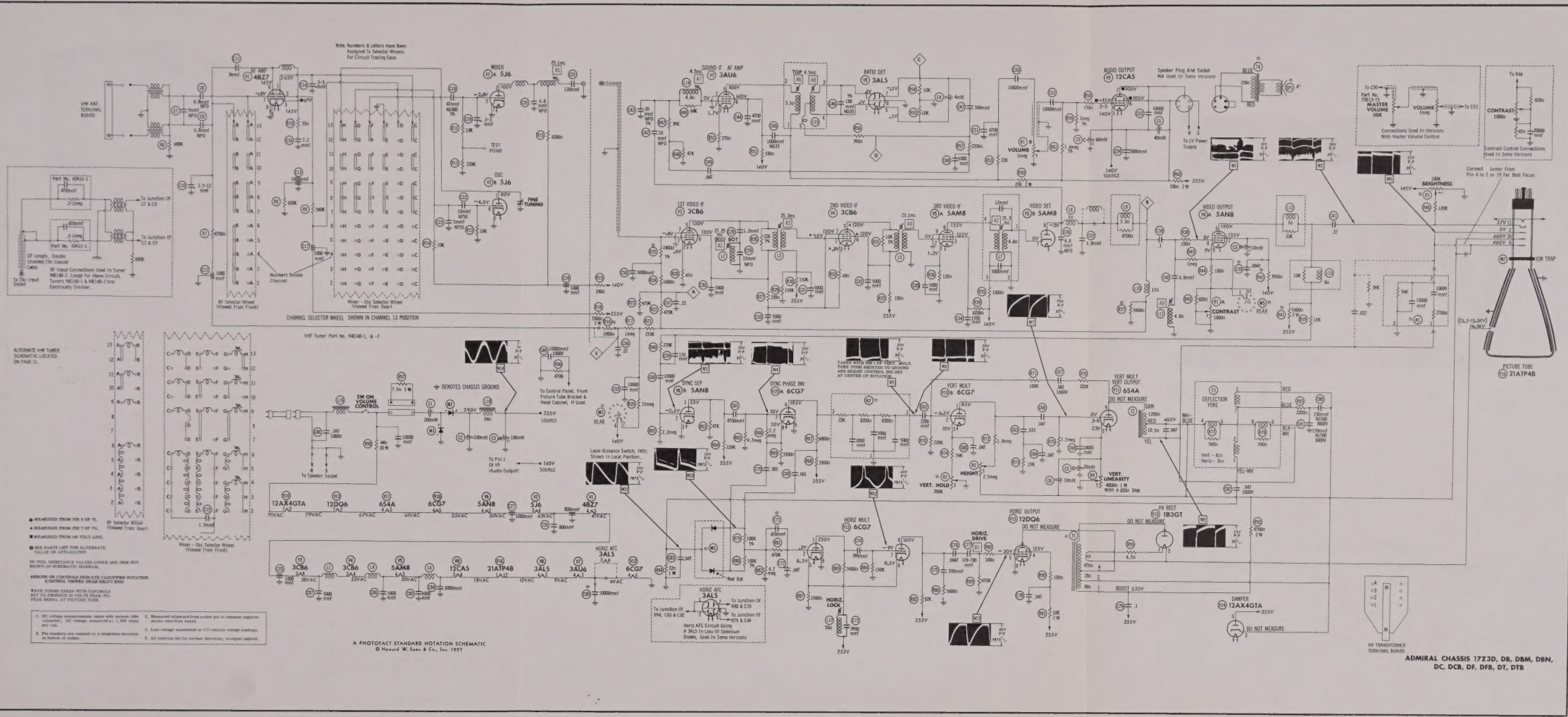
ADMIRAL CHASSIS 17Z3D, DB, DBM, DBN, DC, DCB, DF, DFB, DT, DTB


Note: Numbers & Letters Have Been Assigned To Selector Wheels For Circuit Tracing Ease.
VHF AND TERMINAL BOARD
MIXER V1A 5J6
OSC V2B 5J6
TEST POINT
FINE TUNING
RF Selector Wheel (Viewed From Front)
Mixer - Osc Selector Wheel (Viewed From Rear)
CHANNEL SELECTOR WHEEL SHOWN IN CHANNEL 13 POSITION
Numbers Denote Channel
VHF Tuner Part No. 94E40-1, & -2
SOUND IF AF AMP V7 3AU6
RATIO DET V8 3AL5
AUDIO OUTPUT V9 12CA5
Speaker Plug And Socket Not Used In Some Versions
To LV Power Supply
140V SOURCE
MASTER VOLUME 500K
VOLUME 1meg
CONTRAST 1000Ω
Connections Used In Versions With Master Volume Control
Contrast Control Connections Used In Some Versions
Connect Jumper From Pin 6 to 2 or 10 For Best Focus
100K BRIGHTNESS
1ST VIDEO IF V3 3CB6
2ND VIDEO IF V4 3CB6
3RD VIDEO IF V5A 5AM8
VIDEO DET V5B 5AM8
VIDEO OUTPUT V6A 5AN8
CONTRAST
REAR
IGN TRAP
PICTURE TUBE V18 21ATP4B
SW ON VOLUME CONTROL
DENOTES CHASSIS GROUND
To Control Panel, Front Picture Tube Bracket & Metal Cabinet, If Used.
To Speaker Socket
To Pin 1 Of V9 (Audio Output)
140V SOURCE
SYNC SEP V6B 5AN8
SYNC PHASE INV V10A 6CG7
VERT MULT V10B 6CG7
VERT MULT VERT OUTPUT V11 6S4A
DO NOT MEASURE
DEFLECTION YOKE
Vert - 41Ω
Horiz - 3Ω
Local-Distance Switch (MS) Shown In Local Position.
VERT. HOLD 200K
HEIGHT
VERT. LINEARITY 4000Ω 1 W With a 820Ω Step
HORIZ OUTPUT V13 12DQ6
HORIZ MULT V11 6CG7
HORIZ. DRIVE
HORIZ. LOCK
HV RECT V19 1B3GT
BOOST 530V
DAMPER V20 12AX4GTA
HV TRANSFORMER TERMINAL BOARD
HORIZ AFC 3AL5
Horiz AFC Circuit Using A 3AL5 In Lieu Of Selenium Diodes, Used In Some Versions
ALTERNATE VHF TUNER SCHEMATIC LOCATED ON PAGE 11.
RF Selector Wheel (Viewed From Rear)
Mixer - Osc Selector Wheel (Viewed From Front)
12AX4GTA V14 | 12DQ6 V13 | 6S4A V11 | 6CG7 V10 | 5AN8 V6 | 5J6 V2 | 4BZ7 V1
3CB6 V3 | 3CB6 V4 | 5AM8 V5 | 12CA5 V9 | 21ATP4B V18 | 3AL5 V8 | 3AU6 V7 | 6CG7 V12
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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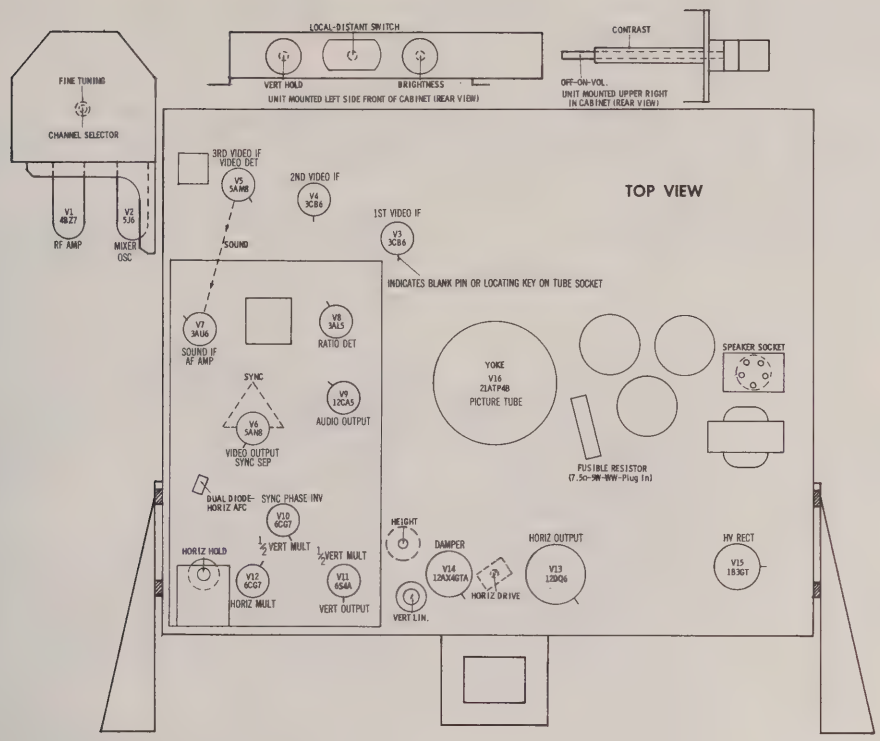
TUBE PLACEMENT CHART



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TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

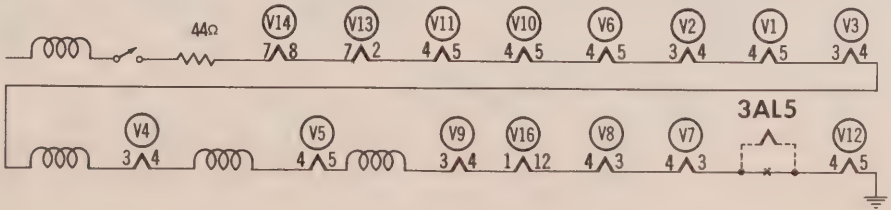
POWER SUPPLY FAILURE
No raster, no sound - Fusible Resistor (R97), Rectifier (M1, M2)

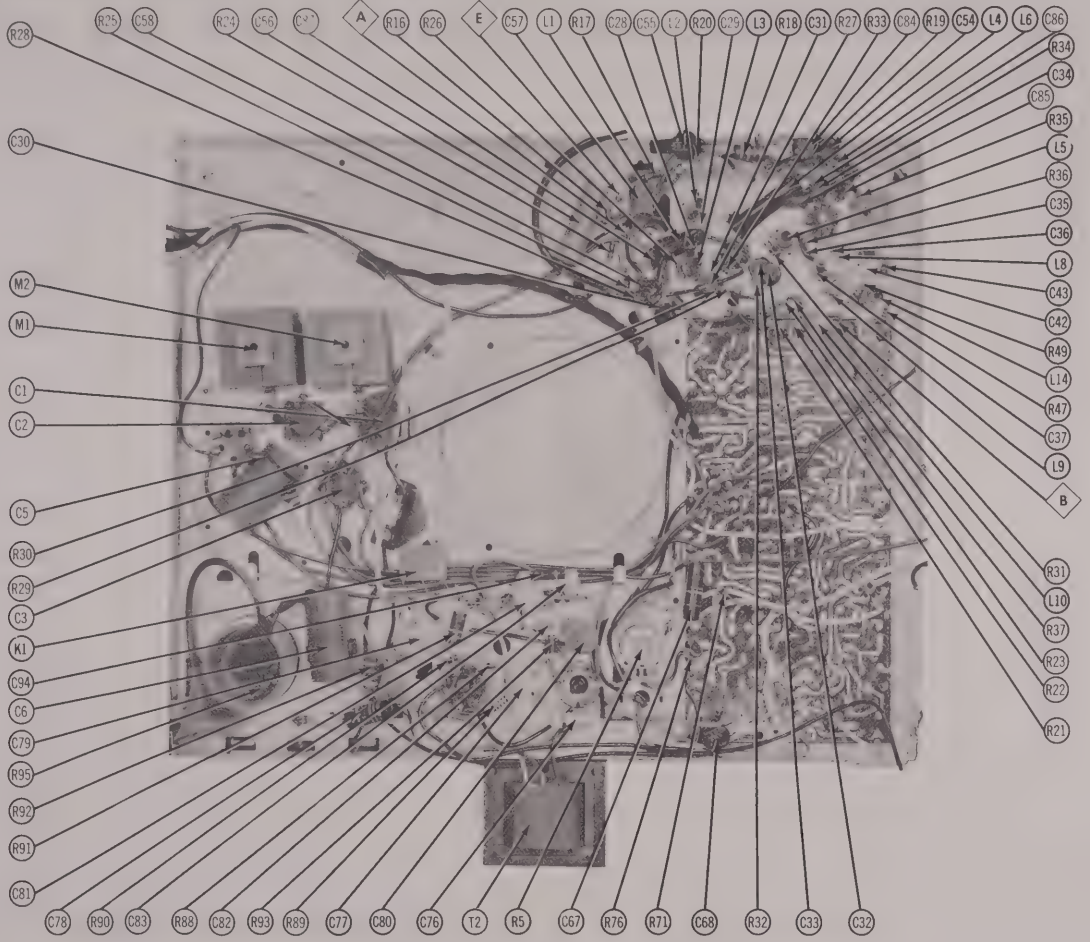
LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V3, V4, V5, V9
No pic, no sound, has snow - V1, V2, V9
No pic, has sound, has raster - V6, V16, V9
Has pic, no sound - V7, V8, V9

SYNC FAILURE
No vert. sync - V6, V10
No horiz. sync - V6, V10, Diode (M3) (Some versions 3AL5)
No vert. or horiz. sync - V6, V10

SWEEP FAILURE
No raster, has sound - V12, V13, V14, V15, V16
No vertical deflection - V10, V11
Poor vert. linearity or foldover - V10, V11
Poor horiz. linearity or foldover - V12, V13, V14
Narrow picture - V12, V13, V14, M1, M2
Vert. off freq. - V10, V11
Horiz. off freq. - V12

This receiver employs tubes used in a series filament network, an open filament in any tube in the series will cause the set to be inoperative. (See circuit below).





CHASSIS BOTTOM VIEW

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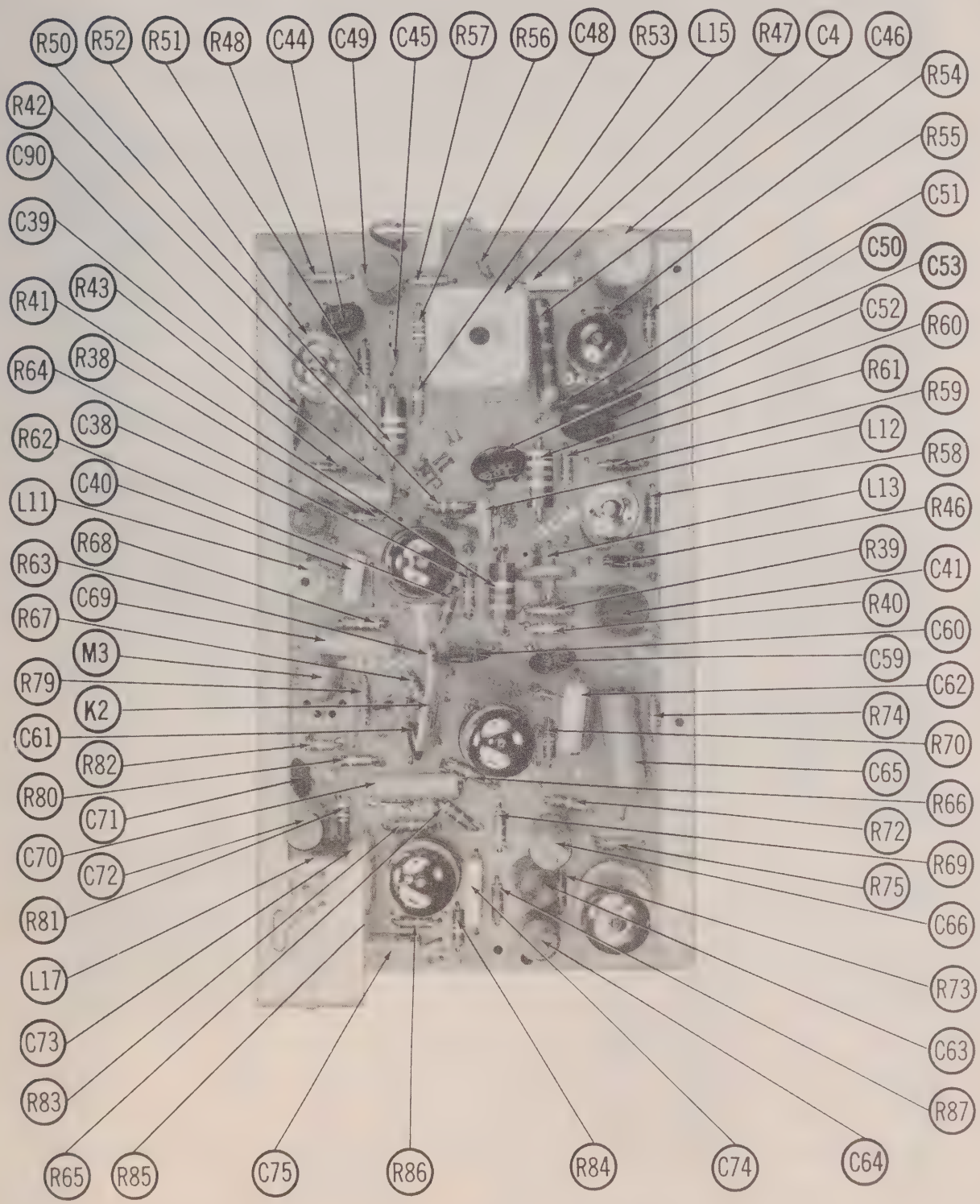

SOUND & SWEEP PRINTED BOARD

SET 363 FOLDER 2

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VIDEO IF ALIGNMENT

Disconnect the antenna leads and connect short jumper across the antenna terminals.
Set the contrast control fully counter clockwise.
Connect the negative lead of a 3 volt bias supply to point (A). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over mixer-oscillator tube (V2). Low side to chassis.	Not used	27.25MC (Unmod)	Any non-interfering channel	USE VTVM. DC probe to point (B). Common to chassis.	A1	Adjust for MINIMUM deflection. Use lowest DC scale on the VTVM.
2.	"	"	"	25.3MC	"	"	A2, A3	Use only enough generator output to provide usable indication on VTVM. Use lowest DC scale on the VTVM. Adjust for maximum deflection.
3.	"	"	"	23.1MC	"	"	A4, A5	Use only enough generator output to provide usable indication on VTVM. Use lowest DC scale on VTVM. Adjust for maximum deflection. Repeat step 1.
4.	"	"	23.0MC (10MC Swp)	21.25MC 24.3MC 25.75MC 27.75MC	"	Vert. Amp. thru 10K to point (B). Low side to chassis.		Check for response similar to Fig. 1 with markers as indicated. If necessary, retouch A2 thru A5 for desired response.

SOUND IF ALIGNMENT

Leave jumper across the antenna terminals as under "Video IF Alignment".
Set contrast control fully counter clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.01MFD	High side to pin 7 (cathode) of 5AM8 (V5). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to point (C). Common to chassis.	A6, A7	Use lowest DC scale on VTVM. Use only enough generator output to provide usable indication on VTVM. Adjust for maximum deflection.
6.	"	"	"	"	DC probe to point (D). Common to chassis.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

4.5MC TRAP ALIGNMENT

Tune in a TV station and adjust A9 for MINIMUM 4.5MC beat interference in the picture.

OSCILLATOR ALIGNMENT

Turn the set on and allow 15 minutes warm-up period.
Set the channel selector to the channel needing adjustment, set other controls for normal picture and sound. Set the fine tuning to the center of its range. Remove the channel selector and fine tuning knobs. Insert a 1/8" flexible, non-metallic screwdriver type tuning tool thru the hole adjacent to the channel selector shaft and adjust the oscillator slug for the best picture. (NOTE: This is not the point at which the sound is the loudest). Repeat this procedure for all channels operating in the area needing adjustment. (NOTE: When adjusting tuners #94E140-1 or 94E140-2 if two slugs appear, adjust upper slug).

RF AND MIXER ALIGNMENT FOR TUNERS #94E140-1, 94E140-2

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

RF AND MIXER ALIGNMENT FOR TUNER #94D122-1

Connect the negative lead of a 3 volt bias supply to point (E). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point (E). Low side to chassis.	A10, A11	Adjust for response curve similar to Fig. 2, with markers above 90%.
8.	"	"	85MC (10MC Swp)	83.25MC 97.75MC	6	"	A12	Adjust for response curve similar to Fig. 2. Adjust for maximum amplitude and flat-topped appearance with markers properly positioned.
9.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response curve similar to Fig. 2. If markers fall below 70% on any high band channel, make compromise adjustment of A10 and A11 with channel swtich set to that channel. If markers fall below 70% on any low band channel, make compromise adjustment of A12 with channel selector set to that channel. Check all other channels to see that they have not been seriously affected.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

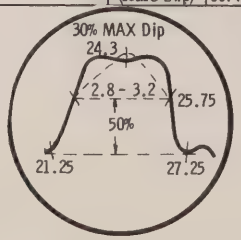

FIG. 1

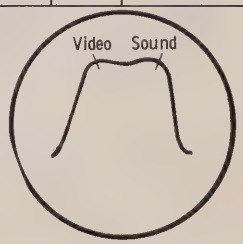

FIG. 2

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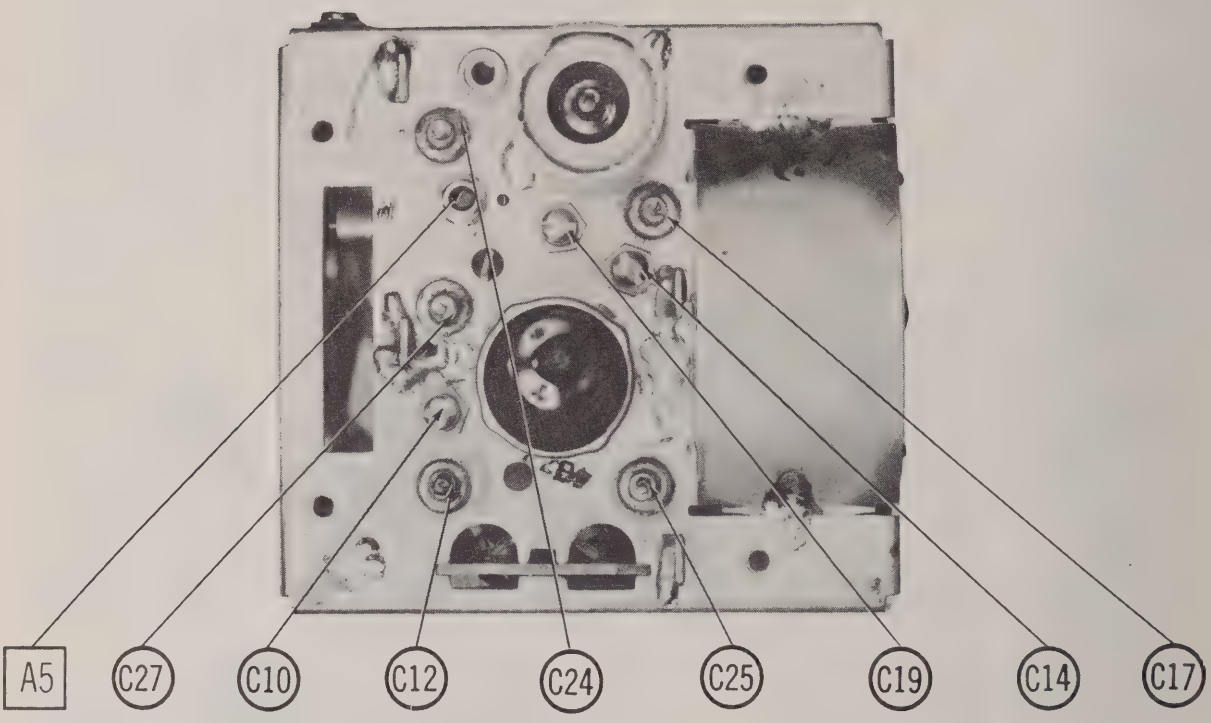
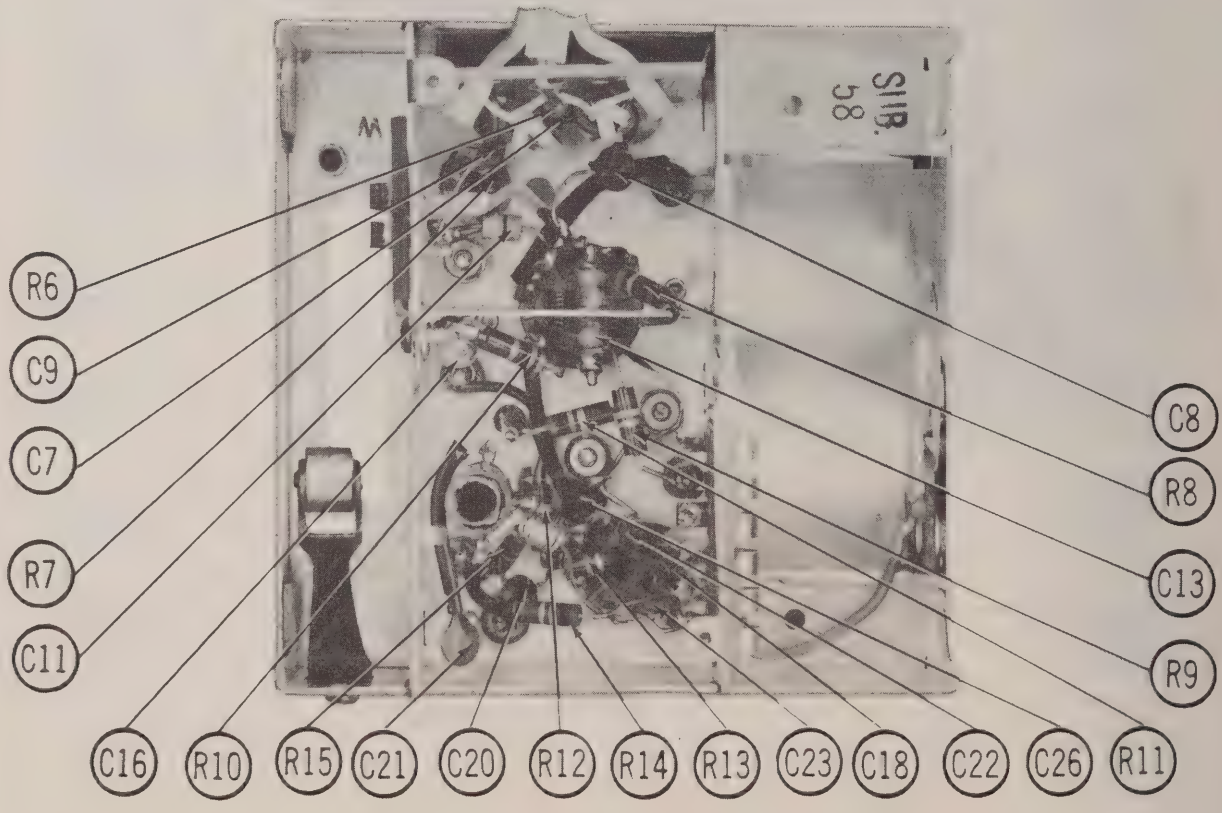
CHASSIS TOP VIEW

ADMIRAL CHASSIS 17Z3D, DB, DBM, DBN,
DC, DCB, DF, DFB, DT, DTB



RF TUNER-TOP VIEW

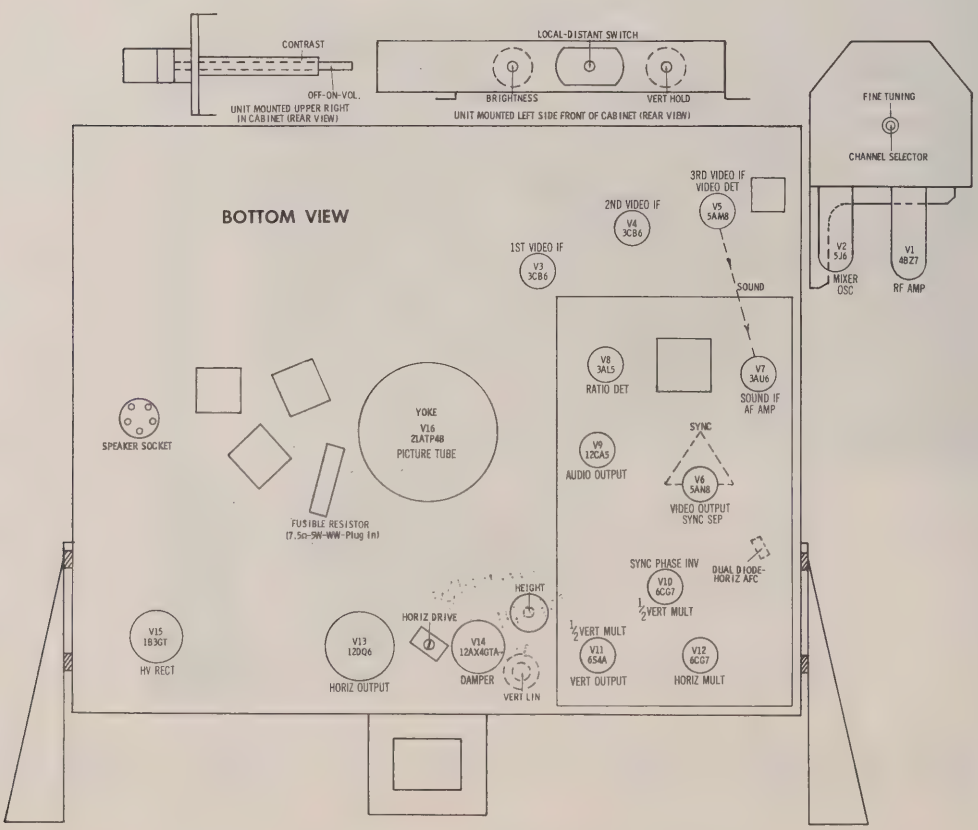


RF TUNER-BOTTOM VIEW

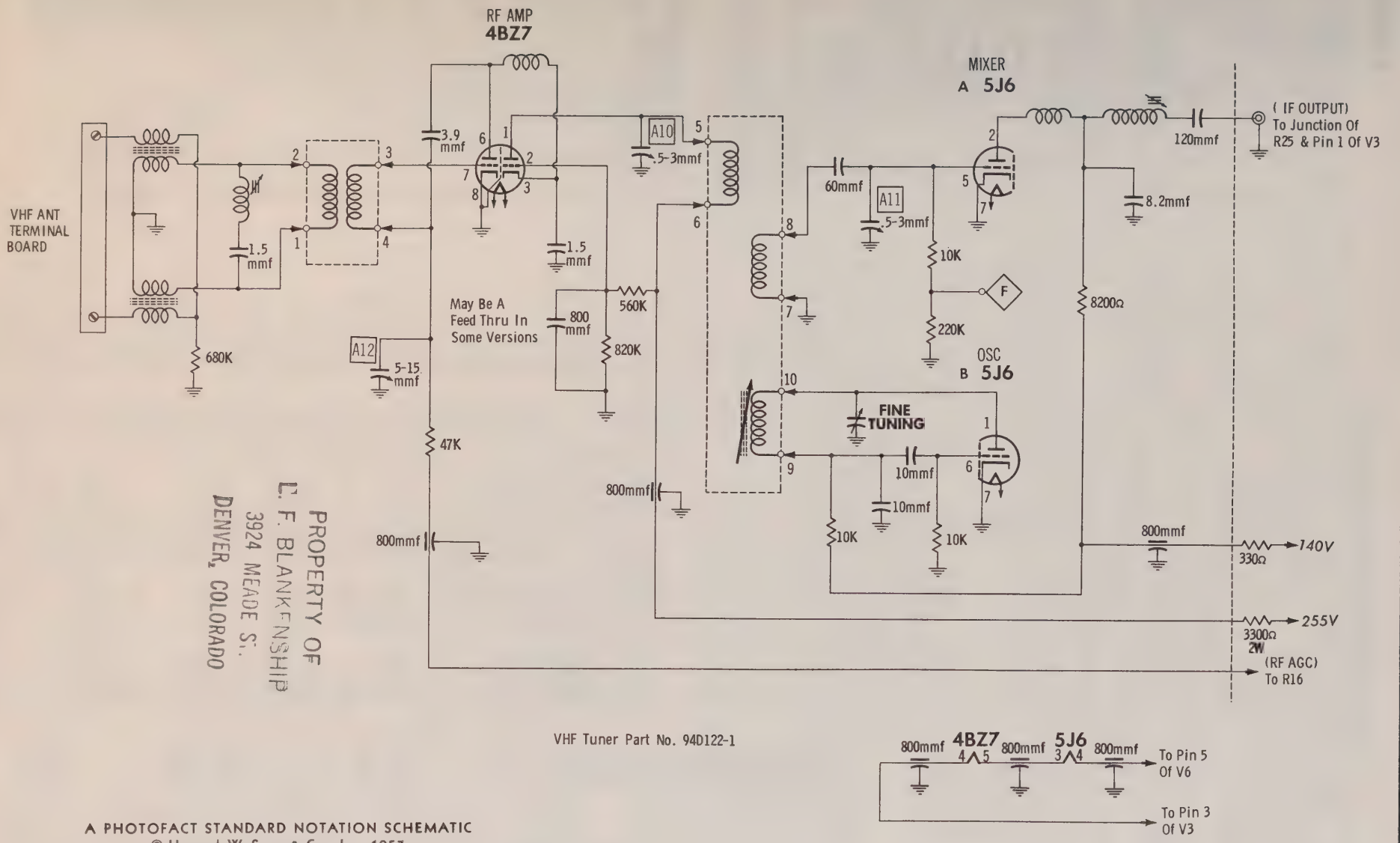
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	4BZ7	† 3300Ω	280K	INF	11Ω	10Ω	INF	1.2Meg	0Ω	0Ω
V2	5J6	■ 10K	■ 8500Ω	12Ω	11Ω	230K	10K	0Ω		
V3	3CB6	240K	47Ω	10Ω	9Ω	▲ 330Ω	▲ 330Ω	0Ω		
V4	3CB6	80K	▲ 68Ω	9Ω	8Ω	† 380Ω	† 380Ω	INF		
V5	5AM8	120Ω	.4Ω	■ 8200Ω	8Ω	6.5Ω	■ 1000Ω	4.4Ω	5600Ω	0Ω
V6	5AN8	† 100K	2.2Meg	0Ω	13Ω	12Ω	† 5600Ω	■ 3900Ω	1Meg	280Ω
V7	3AU6	85K	0Ω	1.5Ω	2.5Ω	† 27K	■ 330Ω	270Ω		
V8	3AL5	INF	INF	2.5Ω	3.5Ω	10K	0Ω	10K		
V9	12CA5	¶	800K	6.5Ω	3.5Ω	800K	‡ 380Ω	‡ 630Ω		
V10	6CG7	‡ • 3.3Meg	220K	• 110K	14Ω	13Ω	† 10K	1.5Meg	3300Ω	0Ω
V11	6S4A	NC	•1400Ω	1.5Meg	15Ω	14Ω	1.5Meg	NC	NC	‡6000Ω
V12	6CG7	† 5700Ω	550K	1500Ω	1.5Ω	0Ω	† 82K	150K	1500Ω	0Ω
V13	12DQ6	TP	15Ω	TP	† 10K	470K	NC	17Ω	0Ω	TOP CAP ‡23Ω
V14	12AX4GTA	NC	TP	¶	NC	† 54Ω	TP	22Ω	17Ω	
V15	1B3GT		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP ‡500Ω
V16	21ATP4B	4.5Ω	56K	PIN 6 ‡4700Ω	PIN 10 ‡4700Ω	PIN 11 • 140K	PIN12 3.5Ω			

NC NO CONNECTION
TP TIE POINT
† MEASURED FROM OUTPUT OF M2.
■ MEASURED FROM 140 VOLT LINE.
• THIS READING WILL VARY, CONTROL SET FOR NORMAL OPERATION.
‡ MEASURED FROM PIN 3 OF V14.
¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
▲ MEASURED FROM PIN 7 OF V4.



TUBE PLACEMENT CHART



PROPERTY OF
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3924 MEADE ST.
DENVER, COLORADO

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALTERNATE TUNER SCHEMATIC

ADMIRAL CHASSIS 17Z3D, DB, DBM, DBN, DC, DCB, DF, DFB, DT, DTB

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	R-F Amplifier	6BZ7	
V2	Mixer-Oscillator	5J6	
V3	1st Video-IF Amplifier	3DB6	
V4	2nd Video-IF Amplifier	3AM8	
V5	Video-Det-1st-Video-Amp	3AM8	
V6	Video-Output-Amp	3AL8	
V7	Sound-IF-Amp-AGC-Amp	3AL8	
V8	Ratio Detector	3AL8	

ITEM No	USE	TYPE	NOTES
V9	Audio Output	1AU8	
V10	Sync. Phase Inverter-Vert. Mult.	6GU7	
V11	Vert. Mult.-Vert. Output	6GA8	
V12	Vert. Output	6CG7	
V13	Horiz. Output	1AH8	
V14	Damper	1AX4-GTA	
V15	H.V. Rectifier	1B3GT	

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	ADMIRAL PART No.	RCA PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V16	21ATP4B	21ATP4 ①	21ATP4 21ATP4A 21ATP4B	21ATP4 21ATP4A 21ATP4B	① Silver screen "65" ② Aluminized

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						
	CAP	VOLT	ADMIRAL PART No.	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	200	250	6TD8-108	AFH31-34-35	AA351B	FP138	TM8-35	S-110	TVL-1431
C2	100	300	6TD8-119	AFH31-55-30	A0340	FP150	TM8-40	S-180	TVL-1679
C3,4	40-80	300	6TD8-117	AFH4-154-60		FP335		S-180	TVL-4550.5
C5	40	150				TC43		MT-1510	
C6	20	300							
C7	20	50	6TB37-3	PRS150V4	BBR4-50	TC30	TD-4-50	MT-0504	TVA-1403
C8	40	300	6TA6-31	PRS250V40	BR5035	TC58	TD-40-350	FM-3540	TVA-1511
C9	80	300	6TA4-34	PRS500V10	BR1350	TC53	TD-10-500	MT-5010	TVA-1963

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA								NOTES
	CAP.	VOLT	ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.		
C1	5		6SD10-108	NPO-S1 5	TCZ-4N7	C10Y5C	TCO-5	ZT-555	5TCCD-V47		NPO
C2	6.8		6SD10-38	NPO-S1 6.8	TCZ-6R8	C10Y6C	TCO-6.8	ZT-5568	5TCCD-V68		NPO
C3	6.8		6SD10-38	NPO-S1 6.8	TCZ-6R8	C10Y68C	TCO-6.8	ZT-5568	5TCCD-V68		NPO
C4	2.2-12		94E140-38								
C11	3		6SD38-030	NPO-S1 3		C10Y3C		ZT-553			
C12	1000		6SD38-5	EF-S01	MPT-1000				503C-DI		
C13	1000		6SD38-6	EF-S01	MPT-1000				503C-DI		
C14	.5-3		94E140-37				S1S-D	CT65A			
C15	1.5		6SD38-083	NPO-S1 1.5	TCZ-1R5	C10Y1.5C		ZT-5515	5TCCD-V15		
C16	2.2		6SD10-37	NPO-S1 2.2	TCZ-2R2	C10Y22C			5TCCD-V22		
C17	1000		6SD38-5	EF-S01	MPT-1000				503C-DI		M1000
C18	47		6SD10-73				S1S-D	CT65A			
C19	.5-3		94E140-37				S1S-D	CT65A			
C20	6.8		6SD10-38	NPO-S1 6.8	TCZ-6R8	C10Y68C	TCO-6.8	ZT-5568	5TCCD-V68		NPO
C21	120		6SD10-90	NPO-S1 120	TCZ-120	L10T12	ED-120	UC-5312	5GA-T12		
C22	10		6SD10-50	NPO-S1 10	TCZ-10	C10Y10	TCO-10	MT-546	5TCCT-G1		N750
C23	5		6SD10-33	N750-S1 5.0	TCN-5	C10Y5U	TCT-5	MT-555	5TCUB-V5		N750
C24	1000		6SB38-5	EF-S01	MPT-1000				503C-DI		
C25	1000		6SB25-5	EF-S01	MPT-1000				503C-DI		
C26	800		6SD10-30	BPD-S008	DD-801	L10T8	ED-800		5GA-T8		
C27	1000		6SB38-5	EF-S01	MPT-1000				503C-DI		
C28	1.5			NPO-S1 1.0	TCZ-1				5TCCB-V1		
C29	5.1		6SC8-80	NPO-S1 15	TCZ-15	C10Q5C	TCO-15		5TCC-G15		NPO
C30	5000			BPD-005	DD-503	BYA10D6	ED-005	DC525	5HK-D5		
C31	5000			BPD-005	DD-503	BYA10D6	ED-005	DC525	5HK-D5		
C32	5000			BPD-005	DD-503	BYA10D6	ED-005	DC525	5HK-D5		
C33	5000			BPD-005	DD-503	BYA10D6	ED-005	DC525	5HK-D5		
C34	1500			BPD-0015	DD-153	BYA10D15	ED-0015	DC515	5HK-D15		
C35	5000			BPD-005	DD-503	BYA10D6	ED-005	DC525	5HK-D5		
C36	6.8		6SC19-8	NPO-S1 6.8	TCZ-6R8	C10Y6C	TCO-6.8	ZT-5568	5TCCD-V68		NPO
C37	6.8			NPO-S1 6.8	TCZ-6R8	C10Y68C	TCO-6.8	ZT-5568	5TCCD-V68		
C38	.1	200				BC81FJ		ACE43E	2HE-P10		
C39	.0047	600		BPD-0047	DS-472		CUB6047	GP-4700	GEM-4347	47M-D47	Note 1
C40	6.8			NPO-S1 6.8	TCZ-6R8	C10Y6C	TCO-6.8	ZT-5568	5TCCB-V68		
C41	.1	600				BCRP3J		ACE403	6HE-P32		
C42	10		6SC6-44	NPO-S1 10	TCZ-10	C10Q5C	TCO-10	ZT-542	5GA-G1		NPO 5%
C43	30		6SC6-80	NPO-S1 30	TCZ-30	C10Q5C	TCO-30	ZT-543	5GA-G3		NPO 5%
C44	4700			BPD-0047	DD-473	BYA10D47	ED-0047	UC-5347	5HK-D47		
C45	1000		6SC19-1	BPD-001	DD-102	BYA5DL	ED-001	DC511	5HK-DL		N033
C46	1.5		6SC6-83								N033 5%
C47	500			SI 500	DS-501	L10T5	GP-500	UC-535	5GA-T5		
C48	1000			BPD-001	DD-102	BYA5DL	ED-001	DC511	5HK-DL		
C49	.047	200				BC84TJ		ACE147	3HE-S47		
C50	1000			BPD-01	DD-103	BYA5DL	ED-01	DC511	5HK-01		
C51	4700			BPD-0047	DD-473	BYA10D47	ED-0047	UC-5347	5HK-D47		
C52	10000			BPD-01	DD-103	BYA5DL	ED-01	DC511	5HK-01		
C53	10000			BPD-01	DD-103	BYA5DL	ED-01	DC511	5HK-01		
C54	5000			BPD-006	DD-503	BYA10D5	ED-005	DC525	5HK-D5		
C55	1000			BPD-01	DD-103	BYA5DL	ED-01	DC511	5HK-01		
C56	22	300		PS8SN-22		CUB32P3		GEM-3023	2TM-P23		
C57	22	100		PS8SN-22		CUB32P3		GEM-3022	2TM-P23		
C58	5000			BPD-005	DD-503	BYA10D6	ED-005	DC525	5HK-D5		
C59	150		6SC38-4	BPD-0015	DD-151	L10T15	ED-150	UC-5315	5GA-T15		
C60	1000			BPD-01	DD-103	BYA5DL	ED-01	DC511	5HK-01		
C61	4700			BPD-0047	DD-473	BYA10D47	ED-0047	UC-5347	5HK-D47		
C62	2200		94C34-16	1464-0053		BS633J			2HE-S22		
C63	.033	600	6SB15-10			BC653J		ACE133	6HE-S33		
C64	.047	400				BC654TJ		ACE134	6HE-S47		
C65	.047	600				BC654TJ		ACE147	6HE-S47		
C66	.047	400		BPD-05	DF-508	CUB4S47		GEM-4347	4TM-S47		
C67	.001	1600		PS8SH-001		CUB1S1		GEM-1521	1TM-D1		
C68	10000			BPD-01	DD-103	BYA5EL	ED-01	DC511	5HK-E1		
C69	.001	400		BPD-001	DD-102	CUB4DL	GP-1000	GEM-421	4TM-D1		
C70	.001	600		BPD-001	DS-102	CUB4DI	GP-1000	GEM-421	4TM-DI		
C71	.470			BPD-0047	DD-471	BYA10D47	ED-470	UC-5347	5HK-D47		Note 2
C72	.047	200				BC84TJ		ACE147	3HE-S47		
C73	3900		6SB3J-392	1464-0089		1SD39			3HS-339		
C74	3300		6SB2J-338			1SS739			2HS-339		
C75	330		6SB3J-331			1SS733			M3-339		10% Note 3
C76	.0047	600		BPD-0047	DS-472	CUB4S47	GP-4700	GEM-4347	4TM-D47		
C77	47-75K		6SA30-3								
C78	.047	600		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47		
C79	.1	600		PS8SH-1	DF-104	CUB5P1		GEM-601	6TM-P1		

CAPACITORS (cont)

ITEM No	RATING		REPLACEMENT DATA						NOTES
	CAP	VOLT	ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C80	250	3000	6SC10-69							
C81	150	3000	6SC10-68							
C82	.047	1000		P10S8N-05		CUB1G047		GEM-10147	1DTM-S47	
C83	.047	300		BPD-05	DF-503	CUB32S47		GEM-3147	3TM-S47	
C84	5000			BPD-005	DD-503	BYA10D5	ED-005	DC525	5HK-D5	
C85	5000			BPD-005	DD-503	BYA10D6	ED-005	DC525	5HK-D5	
C86	5000			BPD-005	DD-503	BYA10D6	ED-005	DC525	5HK-D5	
C87	5000			BPD-005	DD-503	BYA10D5	ED-005	DC525	5HK-D5	
C88	.047	1000		P10S8N-05		CUB1G047		GEM-10147	1DTM-S47	
C89	10000	1000				BY5GB1			2GHEK-91	
C90	10000			BPD-01	DD-103	BYA5EL	ED-01	DC511	5HK-E1	Note 4

Note 1. A 5000MMF is used in some versions, the part is omitted in some versions.
Note 2. A 4700MMF is used in some versions.
Note 3. Some versions may use a 680mmf in this application.
Note 4. Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST ANCE	WATTS	ADMIRAL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1000Ω	½	7SB1J-24	F1-5	RTY-552	QI-524	UE524S	Contrast
B	1Meg			R2-54		*		Volume
C	Switch			KB-1				
R2A	300K	½	7SD13-65	B-48	A47-300K-G	QAI-329	U43	Vert. Hold
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	300K	½	7SC13-65 ①	B-48	A47-300K-G	QAI-329	U43	Vert. Hold
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
A	300K	½	7SC13-63 ②	B-48	A47-300K-G	QAI-329	U43	Vert. Hold
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
A			7SC20-38 ②					Vert. Hold
R3A	100K	½	7SD13-53	B-40	A47-100K-G	QAI-128	U41	Brightness
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	100K	½	7SC13-53 ①	B-40	A47-100K-G	QAI-128	U41	Brightness
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
A	100K	½	7SC13-73 ②	B-40	A47-100K-G	QAI-128	U41	Brightness
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
A	100K	½	7SC30-35 ②	B-40	A47-100K-G	QAI-128	U41	Brightness
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R4	4000Ω	1	7SB37-3		39-4000-1000			Vert. Lin. With 820Ω stop, wire wound Height
R5A	3.6Meg	½	7SC20-30	BX-88	A47-3.6Meg-B	BII-339	TA368L	
B	Shaft			Not Req.	FKB-1/2	TM3-KII	Not Req.	

* Concentrizit Equivalent K-T KII, Base Elements & Shafts BI7-108, PI7-300 (Panel)
BII-127, BI3-316 (Rear)
76-1 Switch

① Alternate part number used in side mounted versions.
② Alternate part number used in front mounted versions.
③ Alternate part number used in versions marked Run 10.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ADMIRAL PART No.	IRC PART No.	
R6	680K			BTS-680K	
R7	4700 Ω			BTS-4700	
R8	820K			BTS-820K	
R9	560K			BTS-560K	
R10	33Ω			BTS-33	
R11	10K			BTS-10K	
R12	330K			BTS-330K	
R13	10K			BTS-10K	
R14	10K			BTS-10K	
R15	5200			BTS-5200	
R16	1000Ω				Note 1
R17	1Meg				
R18	3300Ω	3		BTB-3300	
R19	330Ω			BTS-330	
R20	15Meg				
R21	270K				
R22	470K				
R23	470K			BTS-470K	
R24	1000Ω			BTB-1000	
R25	24000Ω 5%				Note 2
R26	22K 5%				
R27	330Ω			BTS-330	
R28	47Ω			BTS-47	
R29	150K				
R30	150K				
R31	10K 5%				
R32	330Ω			BTS-330	
R33	68Ω			BTS-68	
R34	82000			BTS-8200	
R35	1000Ω				
R36	120Ω			BTS-120	
R37	5600Ω			BTS-5600	Note 3
R38	100Ω			BTS-100	
R39	15K			BTS-15K	
R40	270K			BTS-270K	
R41	5600Ω	2		BTS-5600	Note 4
R42	3900Ω			BTS-3900	Note 5
R43	1Meg			BTS-1Meg	
R44	180Ω			BTS-180	
R45	820Ω			BTS-820	
R46	120K			BTS-120K	
R47	39K			BTS-39K	
R48	47K			BTS-47K	
R49	68K			BTS-68K	
R50	27K	3		BTS-27K	
R51	330Ω			BTS-330	
R52	270Ω			BTS-270	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ADMIRAL PART No.	IRC PART No.	
R53	22K			BTS-22K	
R54	10K			BTS-10K	
R55	10K			BTS-10K	
R56	390Ω			BTS-390	
R57	22000			BTS-22000	
R58	150Ω			BTS-150	
R59	33Meg 5%			BTS-33Meg 5%	
R60	330Ω	2		BTS-330	
R61	1.6Meg			BTS-1.6Meg	
	5%			5%	
R62	2.2Meg			BTS-2.2Meg	
R63	47K			BTS-47K	
R64	220K			BTS-220K	
R65	4.7Meg			BTS-4.7Meg	
R66	2.2Meg			BTS-2.2Meg	
R67	6800Ω			BTS-6800	
R68	3300Ω			BTS-3300	
R69	3300Ω			BTS-3300	
R70	220K			BTS-220K	
R71	100K			BTS-100K	
R72	1.5Meg			BTS-1.5Meg	
R73	15K			BTS-15K	
R74	56K			BTS-56K	
R75	1.5Meg			BTS-1.5Meg	
R76	220K			BTS-220K	
R77	560Ω				
R78	560Ω				
R79	100K 5%				
R80	100K 5%				
R81	470K			BTS-470K	
R82	4.7Meg				
R83	5600Ω				
R84	100K				
R85	82K				
R86	5600Ω				
R87	18000				
R88	100Ω			BTS-100	
R89	470K			BTS-470K	
R90	100Ω			BTS-100	
R91	10K	3		BTS-10K	
R92	4700Ω	2		BTS-4700	
R93	2200Ω				
R94	33Ω	1		BTA-22	
R95	4.7Ω			BWJ-4.7	
R96	470K			BTS-470K	
R97	7.5Ω	5		FR7.5-7.5	
R98	44Ω	10			

Note 1. Not used in some versions.
Note 2. Some versions may use a 2200Ω in this application.
Note 3. Chassis marked Run 14 use a 3900Ω in this application.
Note 4. Chassis marked Run 14 use a 6800Ω, 2W in this application.
Note 5. Chassis marked Run 14 use a 18K in this application.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA								
		ADMIRAL PART No.	Halldorson PART No	Merit PART No	RCA TYPE No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No	
T1	Horiz. Output	78D74-1		HVO-135		X135 ①	*8 HO-254 ①	FLY-107 ①		
T2	Alt. Horiz. Output Vert. Output	78C60-10 78D43-4	Z1607 ②	A-8224 ②	Z1267 ①	V312	A-8141	26854	A-119X	
T3A	Yoke-Horiz. (110MH) (90°) Vert (28MH)	94D67-15	D7907 ④⑤	MDF-02 ④⑤	Z2501 ④ ⑤	Y-90F19 ④ ⑤	DY-16A ④ ⑤	Y-16 ④ ⑤	Y-41, MW1 YC1, CL1 ④	
M6	Rear Cover & Centering Device Yoke Clamp	94A12-1 94B12-1 1PA12-3								

① Trim terminal board to duplicate original and use original mounting brackets.
② Drill new mounting hole(s).
③ Cut and tape yellow lead.
④ Use original horizontal yoke damping network.
⑤ Use original yoke rear cover and centering device.
⑥ This part may be superceded by Parts Manufacturer's introduction of special unit for this application.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

USE	ORIGINAL TERMINAL (CONNECTION)	Halldorson Connections	Merit Connections	RCA Connections	Ram Connections	Stancor Connections	Thordarson Replacement Connections	Triad Replacement Connections
	4				2	3	3	
	2				6	6	6	
	1				4	4	1	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T4	3500Ω	3-4Ω	78D83-11 ① 78D86-3 ② 79D86-4 ③	Z1105 ④ ⑤	A-3031 ④ ⑤	A-3868 ④ ⑤	22S65 ④ ⑤	S-18X ④ ⑤ ⑥	① Used in Models T23A1, B, T23A3, B, T23A5, B, T23A6, B, T23A7, B, C23A11, B, C23A12, B, C23A13, B ② Used in Models C23A26, B, C23A27, B, C23B16C, CB, C23B17C, CB ③ Used in Models C23A1C, C23A2C, C23A3C ④ Drill one new mounting hole. ⑤ Tape taps on primary winding. ⑥ Tape tap on primary winding.

SPEAKER

ITEM No	TYPE				REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C.	IMP.	ADMIRAL PART No.	QUAM PART No.	
SP1	4"	PM		3-4Ω	78B105-3 ① ② 78C31-1 ① ② 78C31-8 ① ③ 78L18-3 ① ④ 78C106-2 ① ⑤	4A07	① Includes T4 and plug (Part #88B3-7). ② Used in Models T23A1, B, T23A3, B, T23A5, B, T23A1, B ③ Used in Models C23A1C, C23A2C, C23A3C ④ Used in Models C23A11, B, C23A12, B, C23A13, B ⑤ Used in Models C23A26, B, C23A27, B
	6"						
	6"						
	6" x 9"						

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		ADMIRAL PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Fil. Choke	T3A2-8	19-3001	TV-189	6175	.6 Microhenry
L2	27.25MC Trap	T3CH1-39	30-1008		6175A	
L3	1st. Video IF	T3CH1-38	17-1062	TV-102 *	6250	
L4	Fil. Choke	T3A2-8	19-3001	TV-189	6175	.6 Microhenry
L5	2nd. Video IF	T3CH1-35	17-1062	TV-102 *	6250	
L6	Fil. Choke	T3A2-8	19-3001	TV-189	6175	.6 Microhenry
L7	3rd. Video IF	T3CH79-1				Includes .0056MFD Cap. & 12MMF Cap.
L8	77.5MC Trap	T3B24-9			6606	2.4 Microhenries
L9	Series Peaking Coil	T3D5-33	19-3180 ▲	TV-184 ▲	6180 ▲	166 Microhenries, wound on 470Ω resistor
L10	Shunt Peaking Coil	T3B5-20	19-3500		6176	500 Microhenries
L11	4.5MC Trap	T3A13-7				
L12	Series Peaking Coil	T3D5-23	19-3300 ▲		6150 ▲	378 Microhenries, wound on 33Ω resistor
L13	Shunt Peaking Coil	T3B5-16	19-6400 ▲		6156 ▲	400 Microhenries, wound on 10K resistor
L14	Sound IF	T2B98-14	30-1005	TV-151	1470	
L15	Ratio Det.	T2C88-4				Tertiary winding .6G
L16	Line Choke					85 Microhenries

* Enlarge mounting hole.
▲ Parallel with 4700Ω resistor.
▲ Parallel with 33Ω resistor.
▲ Parallel with 10K resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA							NOTES
	PRI.	SEC.	ADMIRAL PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	
L17	50Ω		94C17-4		TV-184					

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L18	.210A	54Ω	1.3 Hy.	74B18-15	C5037 ①	C-2996 ①	C-2326 ①	26C44 ①	C-24X

① Drill one new mounting hole.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ADMIRAL PART No.	REPLACEMENT DATA	
K1	Vert. Blanking	10000MMF, 10000MMF, 2700Ω, 56K	63C6-12 ①	Aerovox	PA282
K2	Vert. Integrator	2000MMF, 5000MMF, 5000MMF, 22K, 8200Ω, 8200Ω	63C9-7 ②	Aerovox Centralab Cornell-Dubilier Erie Sprague	PA110 PC-100 115TM1 1405-01 V-1

① Chassis marked Run 14 and higher use individual components in this application as shown on the schematic.
② Chassis marked Run 10 may use alternate part #93C9-1 in this application which is electrically identical.

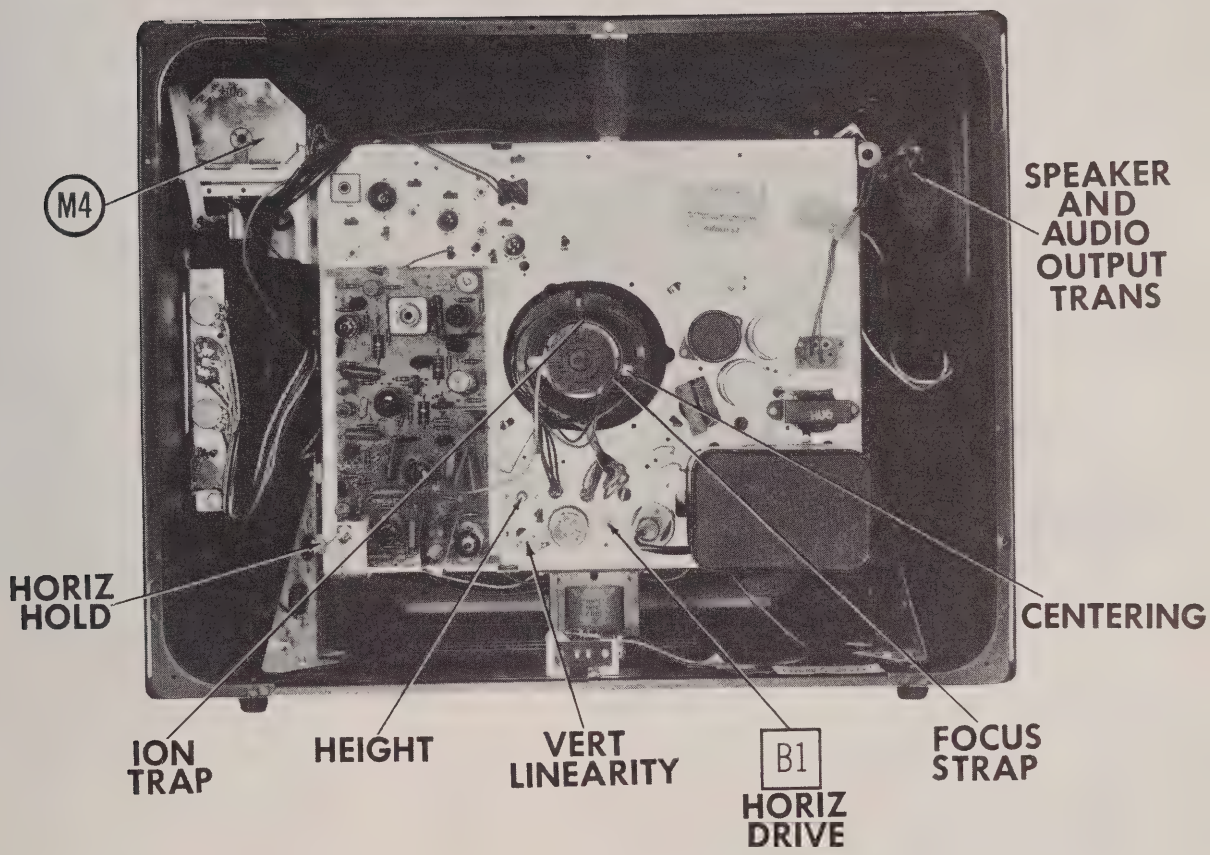
RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT (Measured)	ADMIRAL PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	
M1	.210A	93A4-2 ①	1090A ①	1N1007 ②	RS300SL ①	6S300 ①	300 ①	
M2	.210A	93A4-2 ①	1090A ①	1N1007 ②	RS300SL ①	6S300 ①	300 ①	
M3		93A5-2 ① ④	1215 ① ③		1T1 ① ③			

① Selenium type.
② Germanium type.
③ 2 required.
④ Some versions may use a 6AL5 tube in this application.

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M4	Tuner	94E140-1	Ch. 17Z3DB, DCB, DTB
	Tuner	94E140-2	Ch. 17Z3DBM, DBN
	Tuner	94D122-1	Ch. 17Z3D, DC, DT
M5	Switch	76A3-3	Local-Distant (Rotary wafer) front mounting
	Switch	76B31-3	Local-Distant (Slide type) front mounting
	Switch	76A3-1	Local-Distant (Rotary wafer) side mounting
	Switch	76B31-1	Local-Distant (Slide type) side mounting
M6	Centering Device	94B121-1	Includes yoke rear cover
	Centering Device	94A121-1	Includes yoke rear cover
M7	Ion Trap	94A15-4	



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Turn the set on and tune in a TV station, preferably with a test pattern.

2. Set the brightness and contrast controls for a normal picture.

3. Turn the horizontal hold clockwise until the picture loses sync. It may be necessary to switch off channel and back again for picture to lose sync.

4. Turn the horizontal hold slowly counter clockwise until the picture just falls into sync.

5. Turn to an unused channel. If vertical lines appear near the center of the screen, slowly adjust the horizontal drive trimmer (B1) until white lines disappear.

6. If in step 5 the horizontal drive was adjusted, tune in a TV station and repeat steps 3 and 4. Check horizontal sync by switching off channel and back again.

AIRLINE
MODEL WG-1637A

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TRADE NAME	Airline Model WG-1637A
SUPPLIER	Montgomery Ward & Co., 619 Chicago, Ill.
TYPE SET	AC-DC Operated AM Receiver With Phono Provision
TUBES (Six)	Types 12BA6 Mixer, 12BF6 Oscillator, 12BA6 IF Amplifier, 12AV6 Det.-AFC-AF Amp., 35C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-DC
RATING	.27 Amp. @ 117 Volts AC (26 Watts)
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in the same relative position to chassis as when the receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1MFD	High side to pin 1 (grid) of 12BA6 (V3). Low side to B-.	455KC (400∿ Mod)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2	"	High side to pin 1 (grid) of 12BA6 (V1). Low side to B-.	"	"	"	A1, A2, A3, A4	"
3	"	High side to pin 1 (grid) of 12BA6 (V1). Low side to B-.	1620KC	"	"	A5	"
4	50MMF	High side thru dummy to external antenna. (Clip on loop) Low side to chassis.	1400KC	Tune to 1400KC signal	"	A6	Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

AIRLINE MODEL WG-1637A

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Mixer	12BA6	
V2	Oscillator	12BF6	
V3	IF Amplifier	12BA6	
V4	Det. -AVC-AF Amp.	12AV6	
V5	Output	35C5	
V6	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA AIRLINE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■100	150	45X427	AFH3-12-20	[B0170	[FP216	[TMT-10	[D-086	R2407 *
B	▲70	150			BR2515	TC492	TD-20-150	FM-1540	

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.01	200		BPD-01	DD-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C3	.047	200		BPD-05	DF-503	CUB2S47		GEM-4147	2TM-S47	
C4	47			SI 47	D6-470	LT6Q47	ED-47	UC-5447	5GA-Q47	
C5	.022	200		BPD-02	DD-203	CUB4S22	ED-02	GEM-4122	2TM-S22	
C6	.047	200		BPD-05	DF-503	CUB2S47		GEM-4147	2TM-S47	
C7	.0047	600	RCP10W6472M	BPD-0047	D6-472	CUB6D47	GP-4700	GEM-6247	6TM-D47	
C8	.0022	600		BPD-0022	D6-222	CUB6D22	GP-2200	GEM-6222	6TM-D22	
C9	.01	400		BPD-01	DD-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C10	.047	400		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C11	.082	200								

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA AIRLINE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	B36X393	ABT-63	A47F4-500K	Q18-133X	UT429	Volume, Tap ⓐ 60K
B	Shaft			AK-4	KSS-3	Not req.	Not req.	
C	Switch			KB-1	SWE-12	76-1	US-26	
			30H23					Volume (Alternate)
R2A	1Meg	½	B40X345	B-69	A47-1Meg-S	Q11-137	U54	Tone
B	Shaft			Not req.	KSS-3	Not req.	Not req.	
			30H24					Tone (Alternate)

RESISTORS

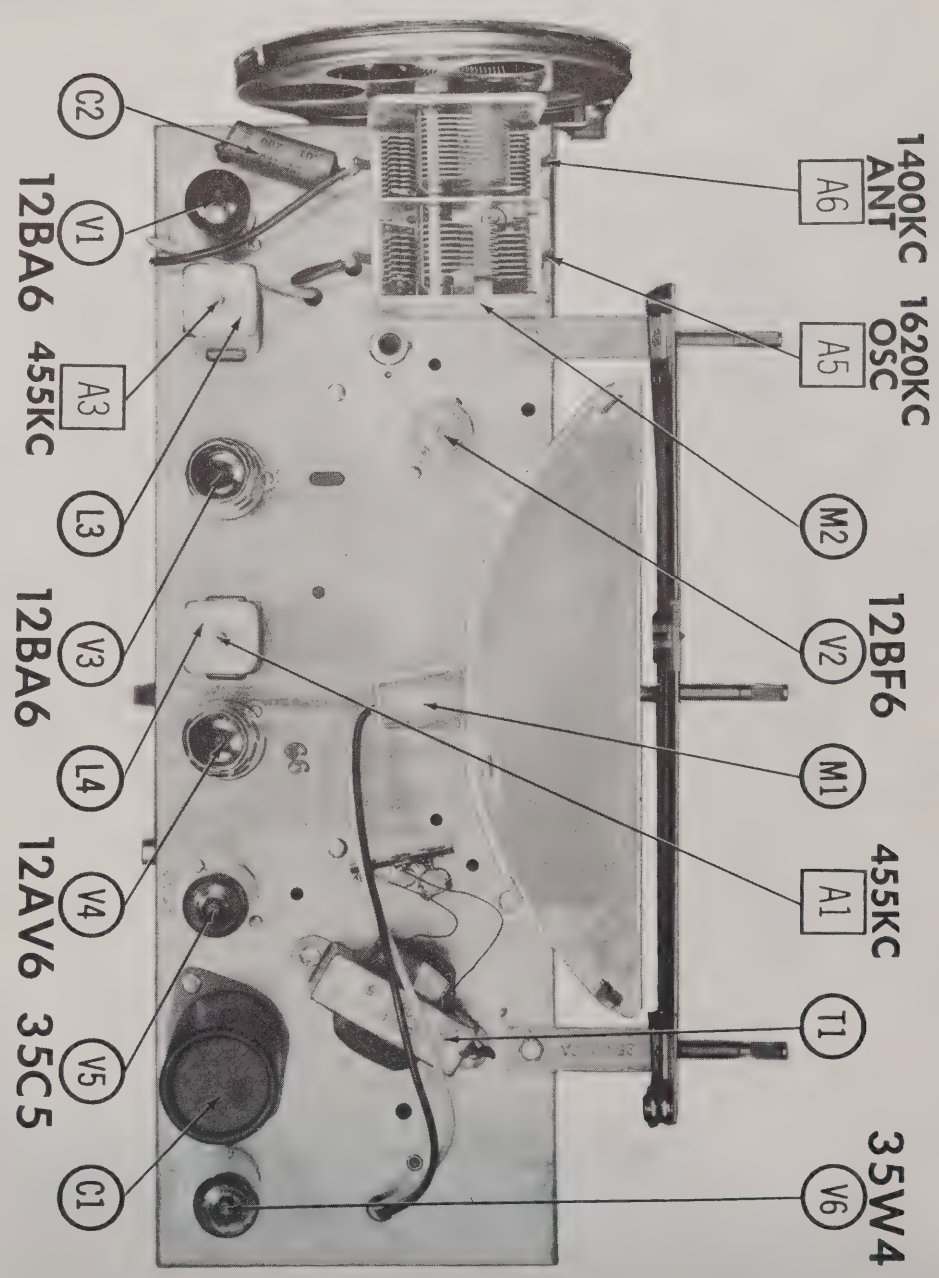
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA AIRLINE PART No.	IRC PART No.	NOTES
R3	27K			BTS-27K	
R4	10Meg			BTS-10Meg	
R5	1Meg			BTS-1Meg	
R6	68Ω			BTS-68	
R7	47K			BTS-47K	
R8	22K			BTS-22K	
R9	10Meg			BTS-10Meg	
R10	180Ω			BTS-180	
R11	1000Ω	1		BTA-1000	
R12	27Ω	1		BTA-27	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA AIRLINE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2400Ω tapped	6-8Ω	51X175						

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	AIRLINE PART No.	QUAM PART No.	
SP1	4"X6"	PM	3-4Ω	12A531 ①	46A1 ①	① Connect in series & phase.
SP2	4"X6"	PM	3-4Ω	12A531 ①	46A1 ①	

COILS (RF-IF)

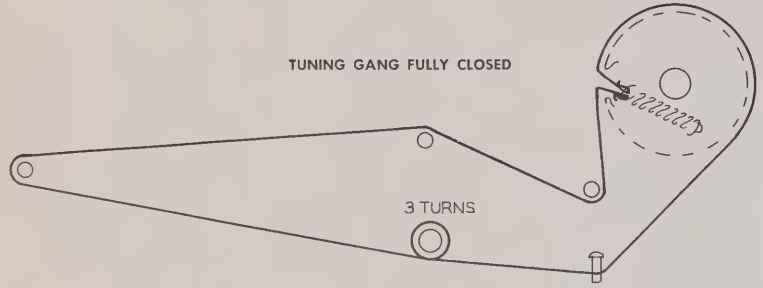
ITEM No.	USE	REPLACEMENT DATA				NOTES
		AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	9A237B				Includes Cabinet Back
L2	Osc. Coil	9A2379	14-1060		71-OSC	
L3	Input IF	9A2343	16-6758	BC-352	12-C1	
L4	Output IF	9A2344	16-6770	BC-355	12-C6	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	AIRLINE PART No.	REPLACEMENT DATA
K1	Audio Coup. Net.	10000MMF, 250MMF, 500K, 500K	76X5	Aerovox PA-112-3 Centralab PC-80 Cornell-Dubilier 113TM1 Erie 1404-01 Sprague T-1

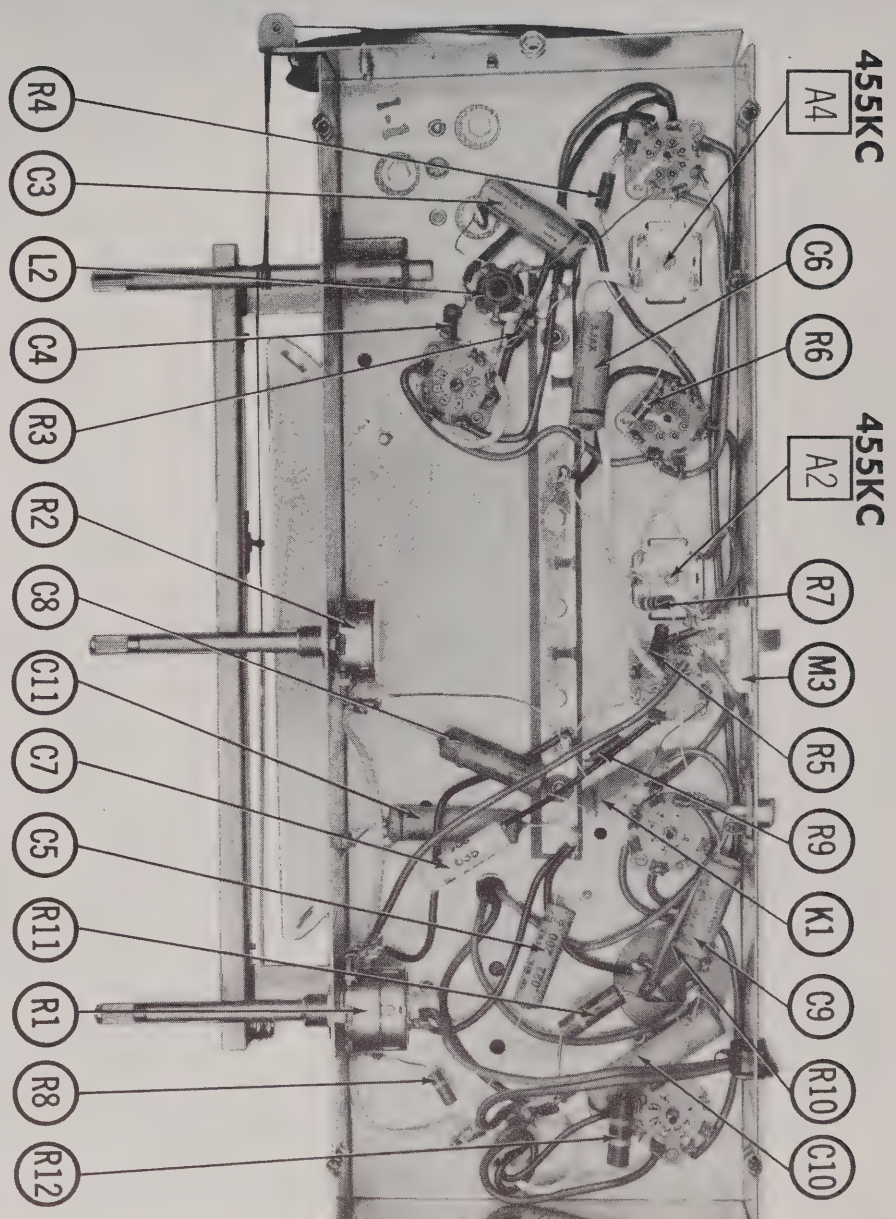
MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M1	Dial Light		#47
M2	Tuning Cap.	14A227	Two Gang (17-380MMF, 14-120MMF)
M3	Switch	2A402	Radio-Phono, Slide Type (DPDT)
	Pointer	15X283	
	Dial Scale	58X799	Brown Cabinet
	Dial Scale	58X790	Red and Cream Cabinet
	Knob	10A806	Brown Cabinet
	Knob	10A808	Red and Cream Cabinet
	Cabinet	55X494	Brown
	Cabinet	55X499	Red and Cream
	Moulding Ass'y.	S-38A48	Brown Cabinet
	Moulding Ass'y.	S-38A75	Red and Cream

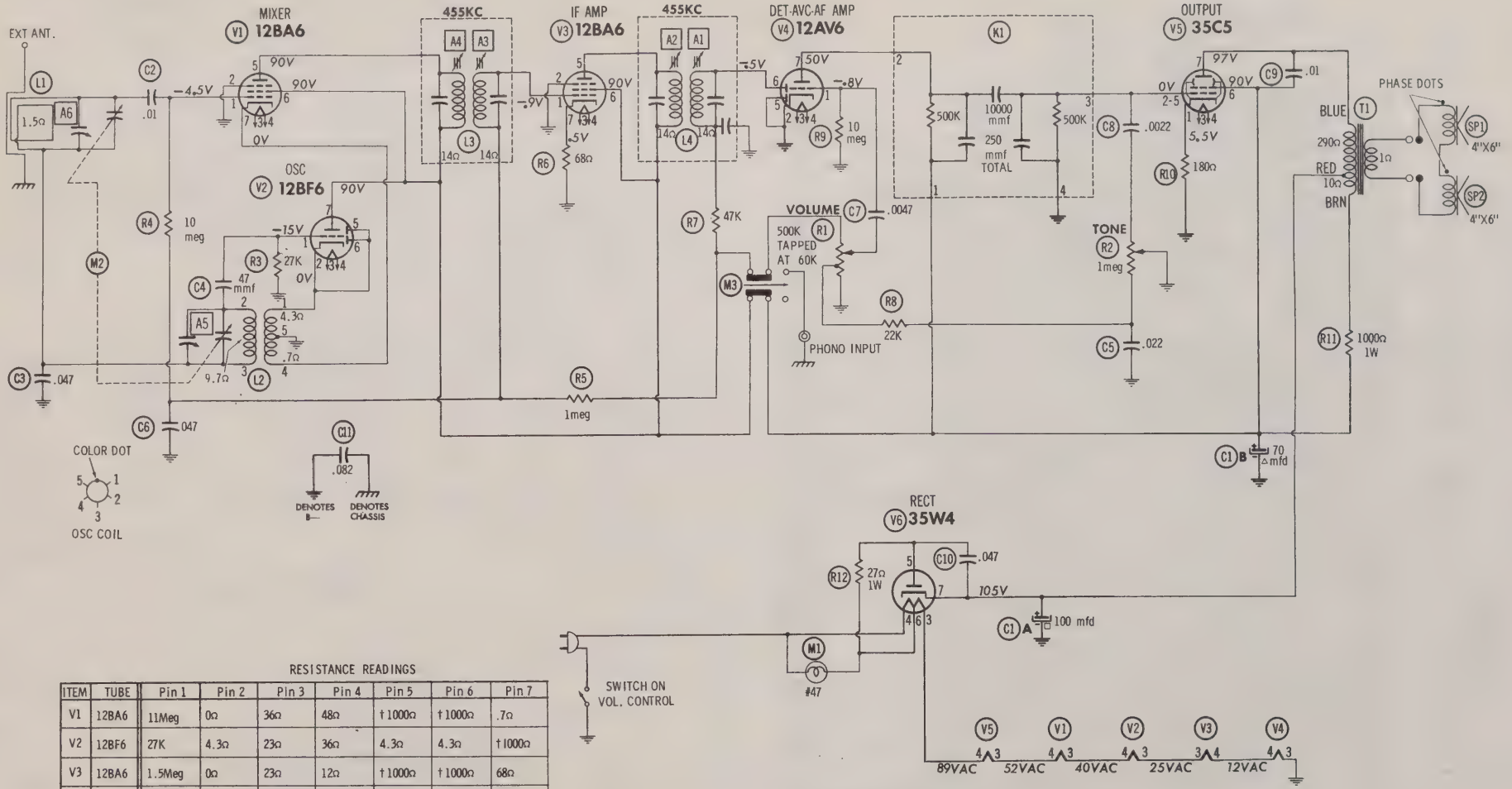


DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



AIRLINE MODEL WG-1637A



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BA6	11Meg	0Ω	36Ω	48Ω	†1000Ω	†1000Ω	.7Ω
V2	12BF6	27K	4.3Ω	23Ω	36Ω	4.3Ω	4.3Ω	†1000Ω
V3	12BA6	1.5Meg	0Ω	23Ω	12Ω	†1000Ω	†1000Ω	68Ω
V4	12AV6	10Meg	0Ω	0Ω	12Ω	0Ω	550K	†500K
V5	35C5	180Ω	500K	48Ω	80Ω	500K	†1000Ω	†290Ω
V6	35W4	NC	NC	80Ω	110Ω	132Ω	105Ω	20K(Min)

† MEASURED FROM PIN 7 OF V6
NC NO CONNECTION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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ANDREA
MODEL TP-8W (Ch. P-8W)

ANDREA
MODEL TP-8W (Ch. P-8W)

ANDREA
MODEL TP-8W (Ch. P-8W)

TRADE NAME	Andrea Model TP-8W (Ch. P-8W)
MANUFACTURER	Andrea Radio Corp., 27-01 Bridge Plaza North, Long Island City 1, N.Y.
TYPE SET	AC Operated Phono Amplifier With 4 Speed Automatic Record Changer
TUBES (Four)	Types 12AX7 AF Amp.-Phase Inv., (2) 6V6GT Output, 6X5GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .42 Amp. @ 117 Volts AC (40 Watts)

FOR SERVICE INOFRMATION ON RECORD CHANGER UNIT - SEE SIMILAR COLLARO MODEL RC-456 - PHOTOFACT SET 342 - FOLDER 3.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

ANDREA
MODEL TP-8W (Ch. P-8W)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp. - Phase Inv.	12AX7	
V2	Output	6V6GT	
V3	Output	6V6GT	
V4	Rectifier	6X5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ANDREA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	450	HCE-1345	AFH4-78-10	DO650	FP431.2	TMQ-99	Q-385	TVL-4736
B	■40	450							
C	▲10	450							
D	20	25							
C2	20	25	HCE-1347	PRS50V20	BBR20-25	TC26	TD-25-25	FM-0225	TVA-1205
C3	6	10VAC	HCE-1343	PRS10VAC8	BBR10-50 }† BBR10-50	TC108		MT-1512 }† MT-1512	R2235 *

† Connect negative lead together.
* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ANDREA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	33		HCC-1962	BPD-000033	DD-330	L10Q33	ED-33	UC-5433	5GA-Q33	
C5	2000		HCC-1954	BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C6	47		HCC-1961	BPD-000047	DD-470	L10Q47	ED-47	UC-5447	5GA-Q47	
C7	.01	600	HCT-1008	BPD-01	DD-103	CUB6S1	GP-10000	GEM-611	6TM-S1	
C8	.05	600	HCT-1012	BPD-05	DF-503	CUB6S5		GEM-615	6TM-S5	
C9	220		HCC-1960	BPD-00022	DD-221	L10T22	ED-220	UC-5322	5GA-T22	
C10	.05	600	HCT-1012	BPD-05	DF-503	CUB6S5		GEM-615	6TM-S5	
C11	.22	200	HCT-1037	P288N-22		CUB2P22		GEM-4022	2TM-P22	
C12	.05	200	HCT-1004	BPD-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C13	10000	1400	HCC-1963	P1688N-01	DD16-103	CUB16S1		GEM-1611	16TM-S1	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ANDREA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2Meg	½	GRV-850	ABT-175		Q13-139XX	UDT-296	Loudness, tap ⓐ 400K & 800K
B	Shaft			AK-3		Not Req.	Not Req.	
R2A	1Meg	½	GRV-854	B-69	A47-1Meg-S	Q11-137	U54	Treble
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KB-1	SWE-12	76-1	US-26	
R3A	3Meg	½	GRV-852	B-84	A47-3Meg-S	Q11-140	U59	Bass
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

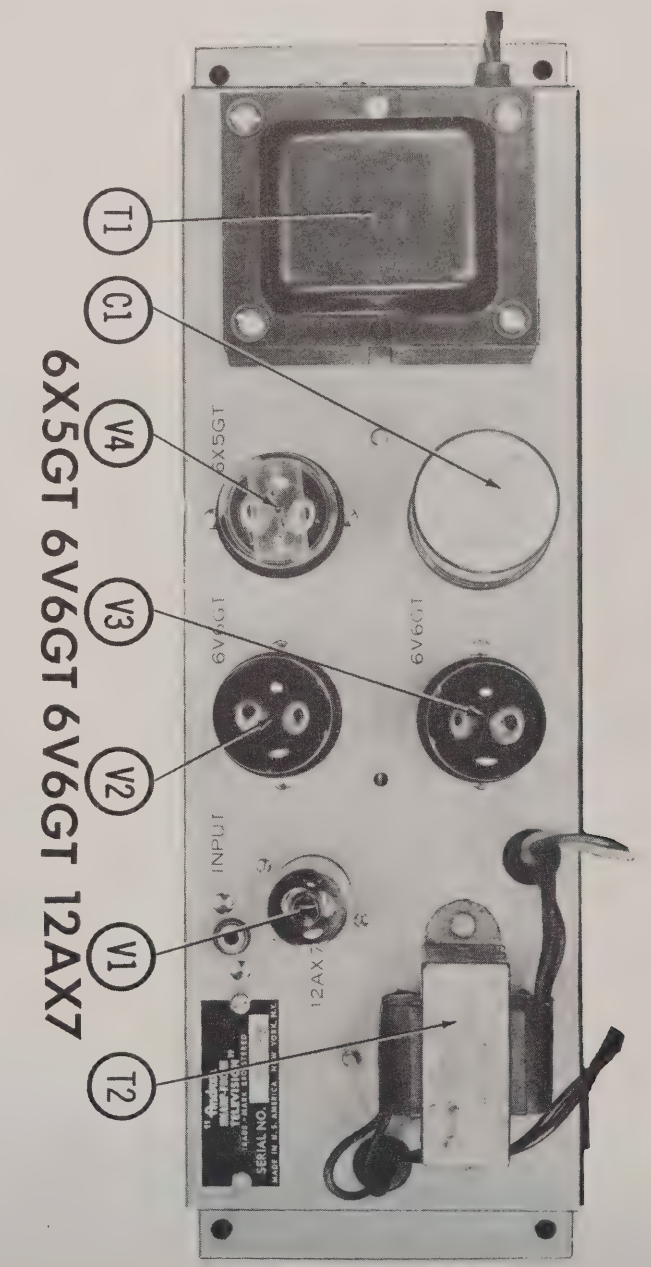
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ANDREA PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R4	220K		GRC-270	BTS-220K	
R5	33K		GRC-203	BTS-33K	
R6	470K		GRC-228	BTS-470K	
R7	470Ω		GRC-213	BTS-470	
R8	2200Ω		GRC-219	BTS-2200	
R9	220K		GRC-270	BTS-220K	
R10	470K		GRC-228	BTS-470K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ANDREA PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R11	1800Ω		GRC-346	BTS-1800	
R12	330K		GRC-301	BTS-330K	
R13	330K		GRC-301	BTS-330K	
R14	270Ω	5	GRW-553		
R15	10K		GRC-304	BTS-10K	
R16	470Ω		GRC-213	BTS-470	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	ANDREA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .42A	500VCT @ .060A	6.3VCT @ 1.9A		ST-3072 ② ST-3079 ③	P9205 ① P9205 ①		PM8403 ① PM8403 ①	22R01 ① 22R01 ①	R-8B ① R-8B ①

① Tape 5V filament winding.
② Used with 60Ω, 117VAC input.
③ Used with 50Ω, 117VAC input.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ANDREA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	8000Ω CT	3-4Ω	ST-3075	Z1002	A-2901	A-3823	22S87	S-53X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ANDREA PART No.	QUAM PART No.	
SP1	3½"	PM	3-4Ω	SL-4033 ①	3A15TZ3.4 ①	① Connect in parallel and phase
SP2	6"	PM	6-8Ω	SL-4031 ①	6A15Z7.5 ①	
SP3	8"	PM	6-8Ω	SL-4030 ①	8A6 ①	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	ANDREA PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	MOUNT	
M1	FM-5434	55-T	GD	56	PT-2	

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESEPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

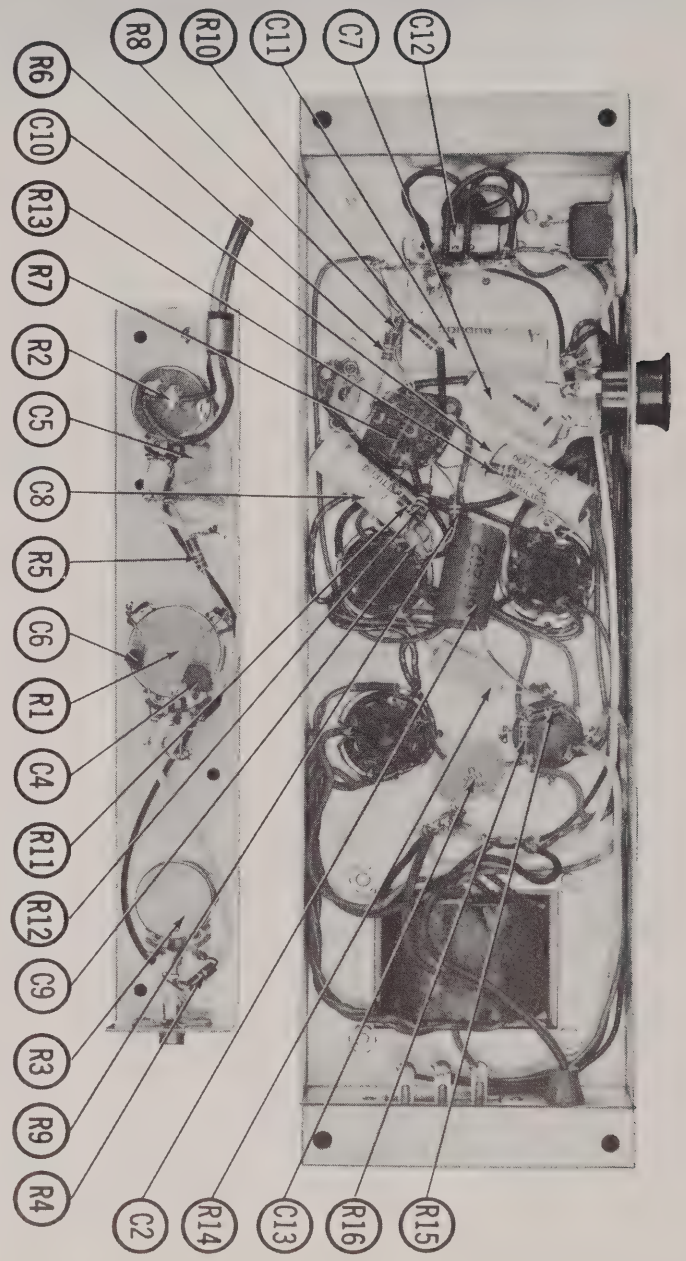
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	ANDREA PART No.	JENSEN PART No.	WALCO PART No.	
M2		*JP-35 or †JPS-35 or †♦JP-35SD or ♦JP-35D	*W-35TPA or †W-35TPS or †♦W-35DS or ♦W-35TPD	* Metal † Jewel ♦ Diamond

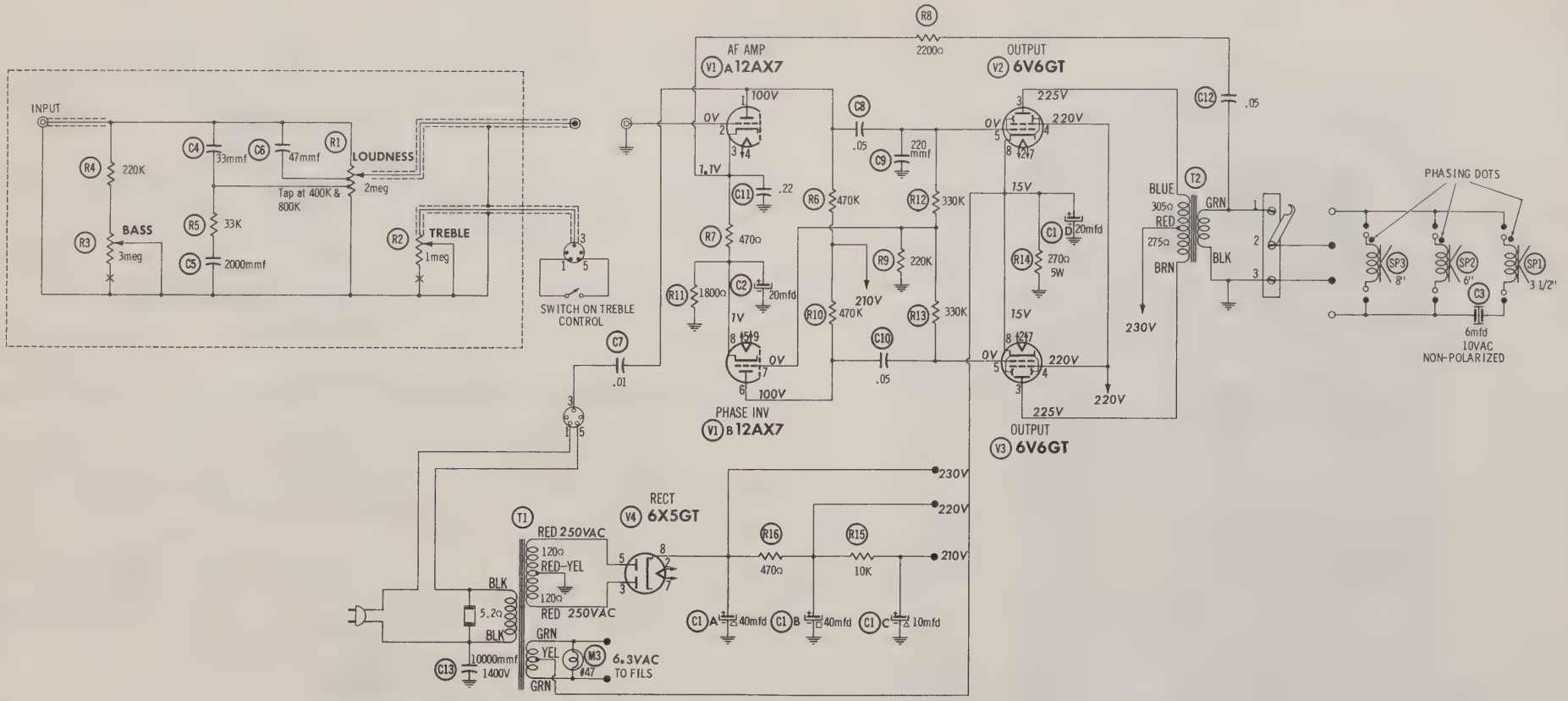
MISCELLANEOUS

ITEM No.	PART NAME	ANDREA PART No.	NOTES
M3	Pilot Light		#47

CHASSIS—BOTTOM VIEW



ANDREA MODEL TP-8W (Ch. P-8W)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†480K	0Ω	2200Ω	270Ω	270Ω	†480K	220K	1800Ω	270Ω
V2	6V6GT	NC	270Ω	†305Ω	†470Ω	550K	TP	270Ω	270Ω	
V3	6V6GT	NC	270Ω	†275Ω	†470Ω	550Ω	NC	270Ω	270Ω	
V4	6X5GT	NC	270Ω	120Ω	NC	120Ω	NC	270Ω	20K (Min)	

† MEASURED FROM PIN 8 OF V4.
NC NO CONNECTION.
TP TIE POINT

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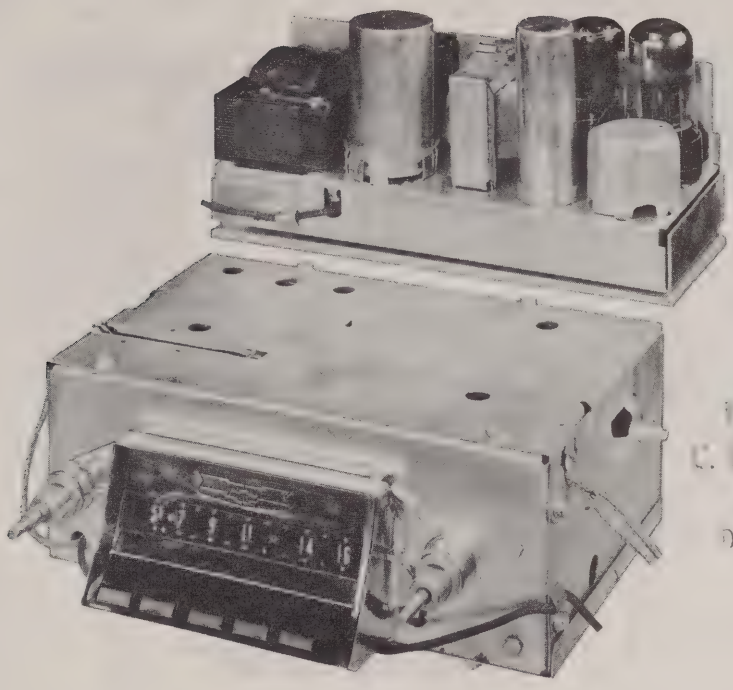
CHEVROLET
MODEL 987693



PROPERTY OF
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3024 MEADE ST.
DENVER, COLORADO

CHEVROLET
MODEL 987693

TRADE NAME	Chevrolet Model 987693 (For 1957 Chevrolet Automobiles)
MANUFACTURER	Delco Radio Div., G. M. Corp., Kokomo, Indiana
TYPE SET	Battery Operated Custom Built AM Automobile Receiver
TUBES (Seven)	Types 12BA6 RF Amplifier, 12BE6 Converter, 12BA6 IF Amplifier, 12BF6 Det. -AVC-AF Amplifier, (2) 12V6GT Output, OZ4 Rectifier
POWER SUPPLY	12 Volt Storage Battery — RATING 3 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Tone control to mid-range.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to chassis.	262KC (400~ Mod)	High frequency end of dial	Across voice coil	A1, A2 A3, A4	Adjust for maximum output.
	If necessary, adjust oscillator core (A8) so that rear of core is 1 5/8" from mounting end of coil form.						
2	68MMF	High side to antenna receptacle. Low side to chassis.	1615KC	"	"	A5, A6 A7, A8	Adjust in order given for maximum output.
3	"	"	600KC	Tune to 600KC signal	"	A9, A10	Adjust for maximum output.
4	"	"	1615KC	High freq. end stop	"	A6, A7	"
5	"	"	900KC	Tune to 900KC signal	"		If necessary, adjust dial pointer adjustment so that pointer coincides with 1000KC when looking directly at dial.
6	With radio installed in car and antenna fully extended, tune in a weak station between 600KC and 1000KC, adjust A7 for maximum volume.						

PUSHBUTTON ADJUSTMENT

1 Pull pushbutton to the left and out.
2 Tune manually to desired station.
3 Press pushbutton in firmly.
4 Repeat on remaining pushbuttons.

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BA6	
V2	Converter	12BE6	
V3	IF Amplifier	12BA6	
V4	Det. -AVC-AF Amp.	12BF6	

ITEM No.	USE	TYPE	NOTES
V5	Output	12V6GT	
V6	Output	12V6GT	
V7	Rectifier	0Z4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	DELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■20	400	6322	AFH3-120	C0990	FP345. 8	TMT-106	T-550	TVL-3678
B	▲20	400							
C	20	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

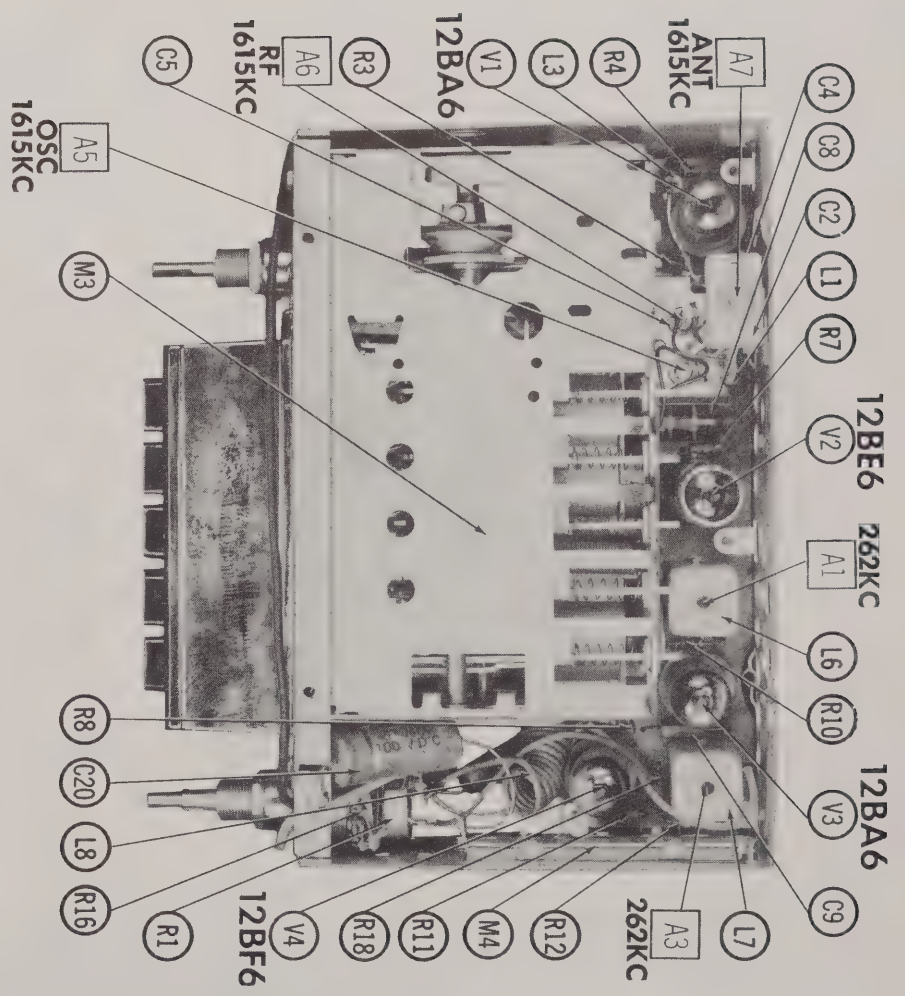
ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	DELCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2A	30-100		7268558							
B	100									
C3	. 047	200	6612	BPD-05	DF-503	CUB2S47		GEM-4147	2TM-S47	
C4	15		6361	BPD-000015	DD-150	L10Q15	ED-15	UC-5415	5GA-Q15	
C5A			7268828							
B										
C										
D										
C6	39		6366	SI 39	DD-390	L10Q39	ED-39	UC-5439	5GA-Q39	
C7	200		7268904							N150 5%
C8	. 047	400	6612	BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C9	100	500	6371	SI 100	DD-101	L10T1	ED-100	UC-531	5GA-T1	
C10	2000		6352	BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C11	68	500		SI 68	DD-680	L10Q68	ED-68	UC-5468	5GA-Q68	①
C12	2000		6352	BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C13	. 002	600		BPD-002	DD-202	CUB6D2	GP-2000	GEM-622	6TM-D2	②
C14	470	1000	6379	HVD-15-470	DD30-471	BYA10T47	HD15-470	DC30347	10GAB-T47	
C15	. 1	400	6613	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C16	. 003	1000	6563	P1088N-003	DD16-302	BYA10D3		GEM-1023	10TM-D3	
C17	. 1	200	6690	P288N-1	DF-104	CUB2P1		GEM-401	2TM-P1	
C18	. 47	100	6692	P288N-47		CUB2P47		GEM-4047	2TM-P47	
C19	. 007	1600	6567	P1688N-007	DD16-702	CUB16D7		GEM-1627	16TM-D7	
C20	. 47	100	6692	P288N-47		CUB2P47		GEM-4047	2TM-P47	

① Some versions may use 120MMF in this application (Part #G-121)
② Some versions may use .001MFD in this application (Part #6627)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	DELCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2Meg	1/2	1220963	F1-68			UE1776S	Tone
B	1Meg			R2-57				Volume, Tap② 200K
C	Switch			KB-7				
D	Bushing			AK-28				

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	DELCO PART No.	IRC PART No.	
R2	2.2Meg		1239	BTS-2.2Meg	
R3	10K	1	1174	BTA-10K	
R4	68Ω		1111	BTS-68	
R5	330K		1229	BTS-330K	
R6	100Ω		1113	BTS-100	
R7	22K		1215	BTS-22K	
R8	1Meg		1235	BTS-1Meg	
R9	15K	2	1277	BTB-15K	
R10	220Ω		1117	BTS-220	
R11	1Meg		1235	BTS-1Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	DELCO PART No.	IRC PART No.	
R12	47K		1219	BTS-47K	
R13	1Meg		1235	BTS-1Meg	
R14	1000Ω		1125	BTS-1000	
R15	2200Ω		1129	BTS-2200	
R16	82K		1222	BTS-82K	
R17	470K		1231	BTS-470K	
R18	3.3Meg		1241	BTS-3.3Meg	
R19	47K	1	1259	BTA-47K	
R20	360Ω 5%	1	7234563	BTA-360 5%	
R21	1800Ω	2		BTB-1800	Note 1
R22	15K	1	1253	BTA-15K	

Note 1. Mfgr. states to replace R21 with 2700Ω 2W (part #1204) & 5600Ω 1W (part #1171) connected in parallel.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	12.6VCT @ 1.9A	480VCT @ .060A			6067	V3902	P-2861	P-6489	22R52	V-31

TRANSFORMER (AUDIO INPUT)

ITEM No.	Resistance		REPLACEMENT DATA						NOTES
	PRI.	SEC.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	1710Ω tapped		1220902						

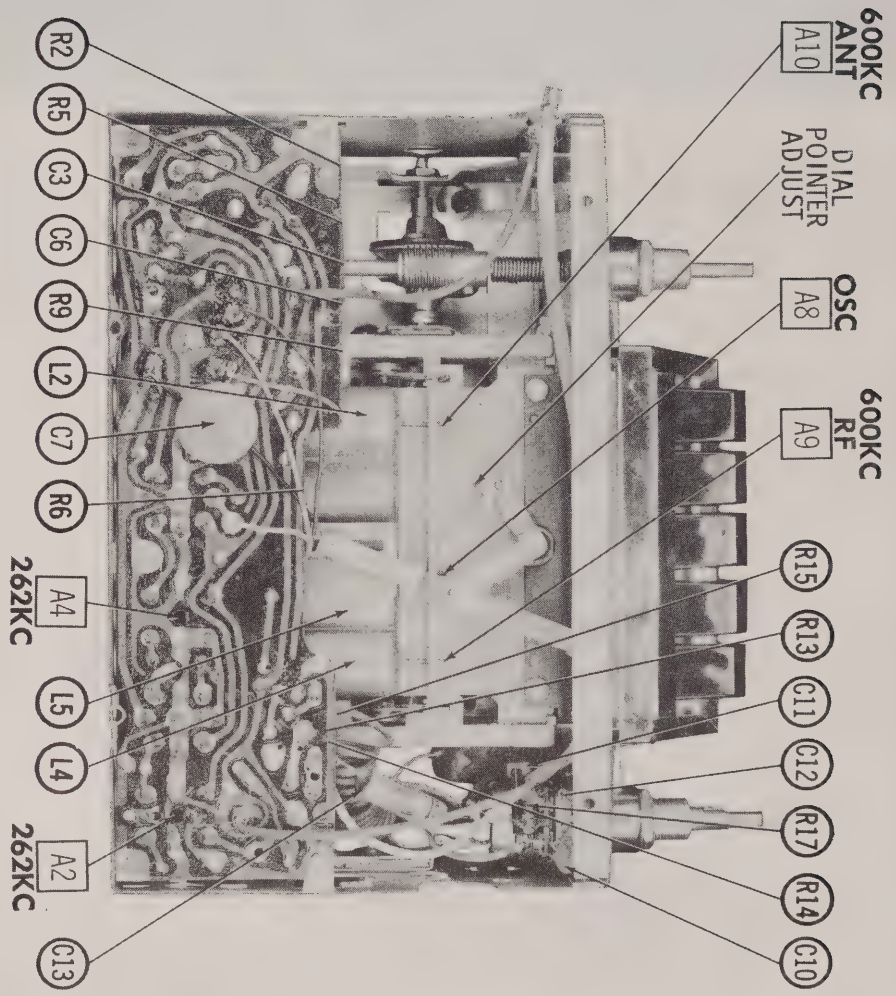
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T3	9300Ω CT	3-4Ω	7269231	Z1011 ①	A-3027 ①	A-3824 ①	26S59 ①	S-55X ①	① Fabricate Mounting

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	DELCO PART No.	QUAM PART No.	
SP1	6"X9"	PM	3-4Ω	1221045	69A2	

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		DELCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coupling Coil	7255738	19-1004	BC-565	4610	6.5 Microhenries
L2	Antenna Coil	1221050				
L3	RF Choke	7240251	19-6022		4626	26 Microhenries
L4	RF Coil	1221050				
L5	Osc. Coil	1221051				
L6	Input IF	1220990	16-6756	BC-317		
L7	Output IF	1220992				
L8	Fil. Choke	1217846				1.4 Microhenries
L9	Hash Choke	7269090				42 Microhenries

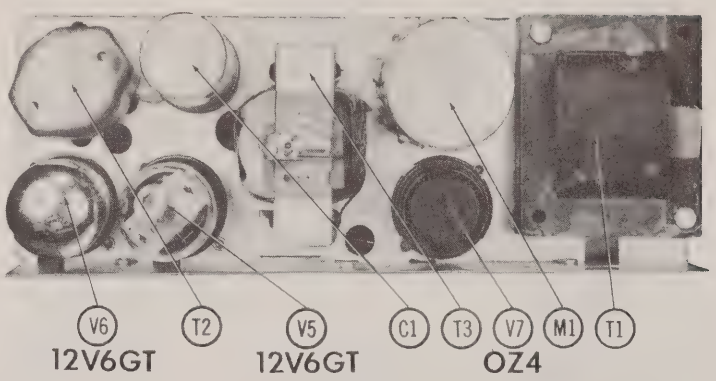
VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				DELCO PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	12.6V	115v	8555	6330	G1602/G883	6330	

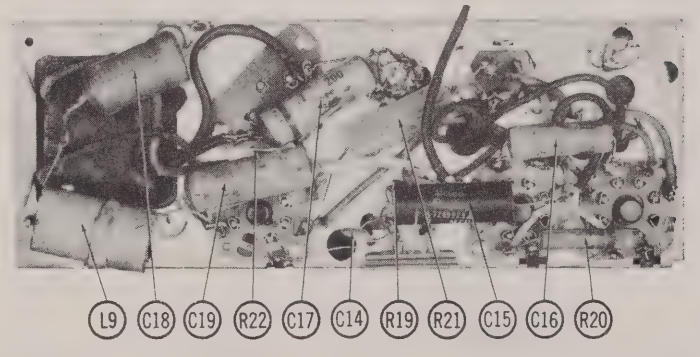
MISCELLANEOUS

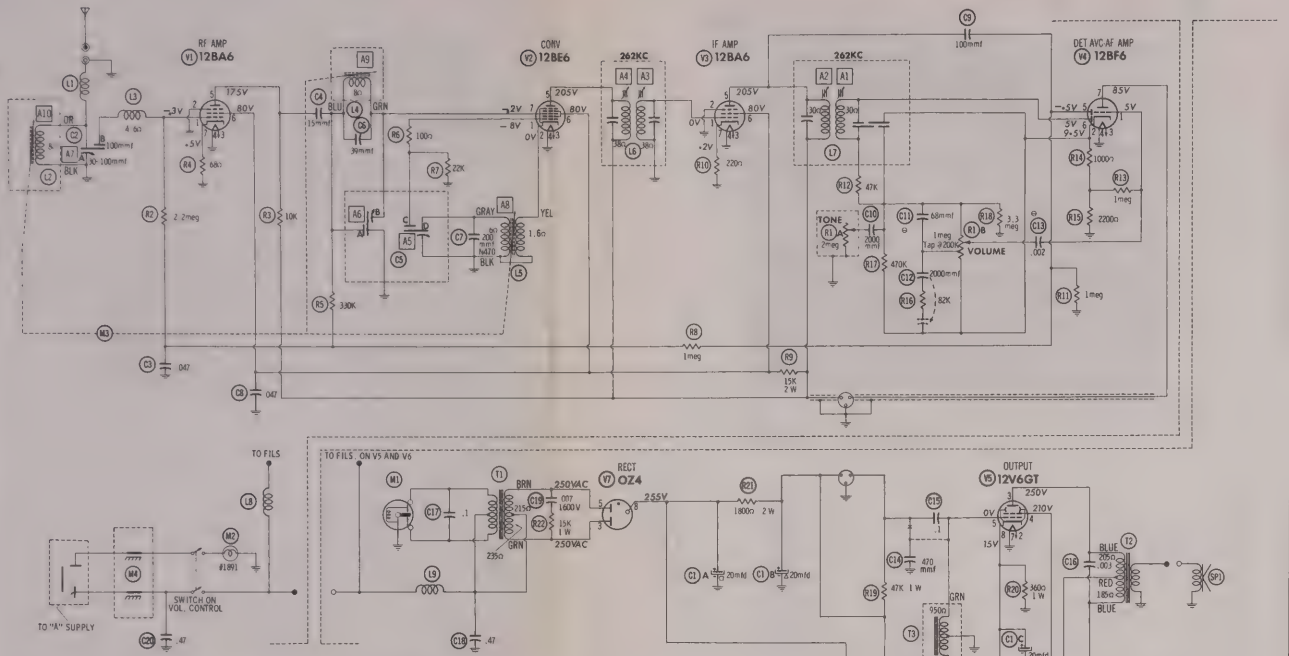
ITEM No.	PART NAME	DELCO PART No.	NOTES
M2	Dial Light	456985	#1891
M3	Tuner		
M4	Spark Plate	1220885	Dual Unit
	Dial Glass	7269200	
	Knob	7268744	Tone, Dummy
	Knob	1990863	Tuning
	Knob	1990864	On-Off-Volume
	Pointer Ass'y.	1221033	

POWER CHASSIS TOP VIEW



POWER CHASSIS BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V1	12BA6	4.2Meg	0Ω	3Ω	0Ω	†12K	†17K	68Ω	
V2	12BE6	22K	1.6Ω	3Ω	0Ω	†1800Ω	†17K	2.3Meg	
V3	12BA6	38Ω	0Ω	3Ω	0Ω	†1800Ω	†17K	220Ω	
V4	12BF6	1Meg	3200Ω	3Ω	0Ω	1Meg	350K	†49K	
V5	12V6GT	NC	3Ω	†205Ω	†1800Ω	950Ω	NC	0Ω	360Ω
V6	12V6GT	NC	3Ω	†185Ω	†1800Ω	760Ω	NC	0Ω	360Ω
V7	OZ4	TP	NC	235Ω	NC	215Ω	NC	TP	20K(Min)

† MEASURED FROM PIN 8 OF V7
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

⊛ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

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COLUMBIA RECORDS
MODEL 560, A

COLUMBIA RECORDS
MODEL 560, A

General Information

Columbia Models 560 and 560A are mechanically alike. The major difference between the two models is in the head used. Model 560 uses a single unit record-erase head while model 560A uses a two unit record-erase head.

Models 560 and 560A are designed to record and play two tracks of material on standard width recording tape. This doubles the recording and playing time without loss of quality or frequency response. Recordings can be made from a phonograph, radio or television receiver, in addition to those made directly from the microphone.

These recorders have two speeds, 3 3/4" and 7 1/2" per second. Using both tracks, the recording times are as follows:

REEL SIZE	3 3/4" SPEED	7 ½" SPEED
5" (600 ft.)	1 hour	½ hour
7" (1200 ft.)	2 hours	1 hour.

Models 560 and 560A are designed to operate on 60 cycle, 110-120 volts, AC supply only. Before connecting to a supply line, be absolutely certain that it agrees with the above specifications.

Supplied by:

Columbia Records
799 Seventh Avenue
New York, N. Y.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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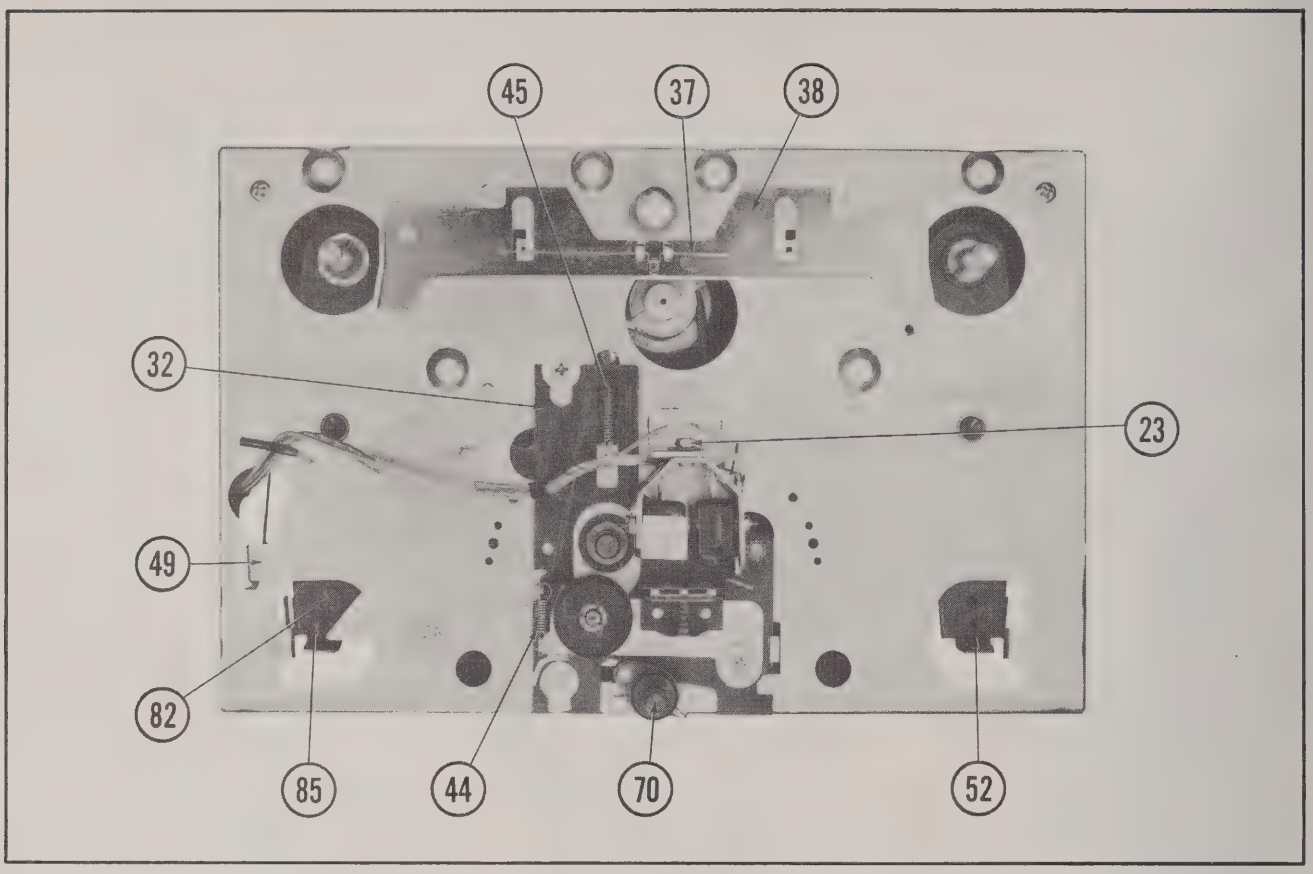

Figure 1

Specifications

Fast Forward And Fast Rewind Speed :

5" Reel, (600 ft.)	55 seconds (Approx.)
7" Reel, (1200 ft.)	105 seconds (Approx.)

Frequency Response:

3 3/4" speed — 65 to 6000 cycles per second
7 1/2" speed — 65 to 8500 cycles per second

Bias and Erase Frequency: 52.5 KC

Bias Voltage:

Shure Head, 10 volts bias
Michicgan Mag. Head, 20 volts bias

Power Output:

2 Watts undistorted
3 Watts maximum

Inputs:

Microphone, 1 meg. impedance
Radio-Phone, .5 meg. impedance

Outputs:

Two internal 5" speakers
External 3.2 ohm speaker
External-low impedance across 3.2 ohm voice coil for external speaker.
External high impedance for external amplifier or monitor in Record or Playback position.

Maximum Reel Size:

7" (1200 ft.)

Operating Instructions

Speed Control

The operating speed setting is accomplished by placing the speed control button (1) in either the "Up" or "Down" position. "Up" for 3 3/4" per second and "Down" for 7 1/2" per second.

CAUTION: NEVER operate this control unless the ON-OFF switch (12) is in the ON position.

Threading Tape

1. Place a reel of tape on the right reel plate (9), and an empty reel on the left reel plate (9) making certain the reel slots engage the pins on the reel plates.

2. Turn the Play-Record control knob (5) in the center of the machine to the fully counterclock-wise position.

3. Unwind about 10" of tape from the reel. Hold a section of the tape straight with both hands and insert the tape in the tape slot making certain that the dull coated side faces the rear of the recorder.

4. Insert the end of the tape into one of the three radial slots in hub of the tape-up reel. Turn the reel several turns, clockwise, until the tape is secured to the reel and all slack is taken up between the reels.

To Record From Microphone

1. Turn the recorder on by rotating the "Tone" control to the right. Allow about 30 seconds for the tubes to warm up.

2. Insert the microphone plug into the "Mike" jack.

3. Adjust the speed control knob (1) for the desired speed — 3 3/4" or 7 1/2" per second.

4. Push down on the Play-Record control knob

(5) as far as it will go. Hold knob down and turn clockwise until it locks.

5. Hold the microphone away from your mouth about 6 to 12 inches and speak in a normal voice. DO NOT SHOUT. Adjust the volume control until the record level indicator flashes on the loudest sounds.

Note: Correct volume level on recording is very important. Too weak a signal, which does not cause flashing on the recording level indicator, will result in weak playback and high background noise. Too strong a signal, which causes continuous flashing of the level indicator, will result in distortion during playback.

To Record From Radio:

Recordings from a radio may be made by one of these methods.

1. Through the microphone by pickup from the radio speaker:

Place the microphone about 6" to 12" in front of the radio speaker. Turn the radio volume control to a normal level. Setting it too high will cause distortion. Turn the radio tone control to treble or high. Set the recording level and record as under "To Record From Microphone".

2. Though a direct connection to the Radio speaker:

Make up a shielded cable with a two conductor phone plug on one end and two alligator clips on the other end. Connect the alligator clips across the voice coil terminals of the radio speaker and insert the plug into the "Radio-Phono" jack. Set the radio volume and tone controls as described above. Set the recording level and proceed as described under "To Record From Microphone".

3. Through a direct connection to the volume control of the radio:

Make up a shielded cable with a two conductor phone plug on one end. Connect the other end across the radio volume control. Insert the phone plug in the "Radio-Phono" jack. Set the recording level and proceed as described under "To Record from Microphone". The radio volume and tone controls do not affect this set up, consequently they may be set any place.

To Record From Record Player

1. If the Record Player being used has a phone type plug on the pick-up leads, insert it into the "Radio-Phono" Jack. Set the recording level and proceed as listed under "To Record From Microphone".

2. If the Record Player has a standard pin type plug, which is more common, an adapter is needed. Insert the pin plug into the adapter and plug the adapter into the "Radio-Phono" jack.

To Record From Television Receiver

Use one of the three methods described under "To Record From Radio".

Dual Track Recording

This recorder is designed to record and play on one-half the width of the tape at a time; thereby resulting in two track recording. To record on the other half of the tape remove the full reel from the takeup (left) side, turn reel over and place it on the feed (right) side. In playing or recording you may stop any place and reverse the reels to use the other track.

Fast Forward And Fast Rewind

High speed forward or rewind operation may be obtained by pressing the desired knob (13) toward the head cover. This will wind the tape on the desired reel at a high speed as long as the knob is held in this position.

NOTE: Do not attempt fast forward or rewind operation with the Play-Record control on any setting except neutral position, as damage to the unit or tearing of the tape will result.

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Braking

This recorder contains an automatic brake mechanism giving more accurate tape control. To stop the tape at any time, when operating on fast forward or fast rewind, simply release the forward or rewind control. The tape will automatically come to a stop.

To Play A Recording

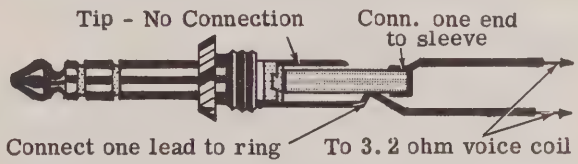
1. Thread the tape as described under "Threading Tape".

2. Turn play-record control (5) clockwise without depressing until it locks.

3. Adjust the "Volume" and "Tone" controls (12) to desired listening level.

To Use An External Speaker

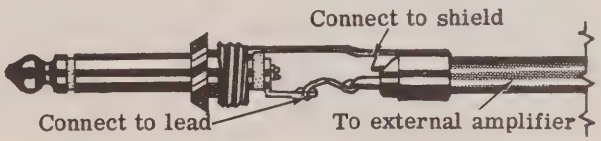
Plug external speaker through a three conductor plug into the "Output Jack". Connect the three conductor plug as shown in sketch.



Caution: Do not insert plug into recorder without external speaker attached.

To Use An External Amplifier

Plug the external amplifier into the "Output Jack" through a two conductor plug connected as shown in sketch



To Edit And Splice Tape

NOTE: Since it is impossible to edit and splice one track without affecting the other, recordings to be edited should be limited to one track only.

1. Tape may be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements can be inserted between selections, etc. Unused tape can be spliced for re-use.

2. For best results cut tape at a slight diagonal, joining ends together with a butt joint and fastening on the glossy side with splicing tape. Trim off any excessive width.

To Erase A Recording

In the record position any recording on the tape is automatically erased before the new recording is put on the tape. Should it be desired to erase a recording without recording new material, follow the normal recording procedure, except set the volume control to the full counter-clockwise position.

Adjustments

Spindle (19 and 48) End Play Adjustment

The spindles should have from 1/32" to 1/16" of up and down movement. To adjust loosen set screw (65) on spindle to be adjusted and move the pulley (55) up or down as required until the correct end play is obtained.

Take-Up Lever Adjustment

Spring (83) on take-up lever (90) controls the timing of the left take-up reel holder (9). With the control knob (5) in the play back position, the take-up reel should start revolving at the same time or a little after the Pressure Roller (43) starts pulling the tape past the head (39).

Check adjustment by placing a fully loaded 7" reel on the take-up spindle. Rewind for about 10 seconds. Move the control knob (5) to the playback position and observe the action described above.

If adjustment is required, bend ear on take-up arm (85) in the position and direction indicated in sketch on exposed view. Care must be exercised when making this adjustment and repeated trials between bends should be made.

Take-Up And Feed Reel Drag

When the control knob (5) is placed in the "Neutral" position the reels should stop promptly with a minimum of overrun. There should be no looping of the tape. With control knob (5) in the neutral position and without reels on the holders, they may revolve slightly, but once the reels are put in place they should not revolve.

Stops, labeled "C" and "D" on figure 2, located on base plate (22) controls the above action. They regulate the amount of return that take-up arm (85) or rewind arm (52) makes after controls have been released; not sufficient return would cause continued Fast Rewind or Fast Forward operation, while too much return would not allow drive belts (88) or (59) to put a drag on the respective pulleys. Bend these stops carefully so as to obtain operation described above. Stop "C" controls the take-up side while stop "D" controls the rewind side.

Head Alignment Adjustment

It is extremely important that the Head (39) be lined up perfectly with the tape. If not the result will probably be low output, track overlap, or loss of high frequencies.

1. Model 560 (SHURE Head)

If the SHURE Head requires replacement the complete assembly composed of the head and head holder should be replaced. The head holder is adjusted individually to the head and sealed at the factory. When installing head (39A) observe the following precautions:

HEAD HEIGHT: Place a .179" gauge (between 11/64" and 3/16") near the mounting bracket and between base plate (22) and bottom of head holder. Push down on head (39A) and tighten set screw (23). Remove gauge.

An alternate method of adjusting the head height when a gauge is not available follows:

a). Remove the pressure shoe assembly (36) from the pressure bracket so the head can be observed through the opening in the pressure bracket.
b). Align head (39A) so the bottom of the head opening is at the same level (or slightly higher) as the corresponding bottom of the opening of the pressure bracket.
c). With the unit pulling tape, the tape should approach the take-up reel nearly centered between the flanges of the reel. If the tape runs against the bottom flange it is an indication that the head is too low.
d). Make "Output Response" adjustment as described in Section 3 below.

2. Model 560A (Michigan Magnetic Head)

On units using the Michigan Magnetic Head a simple alignment procedure is as follows:

a). Place a full reel of tape on the right hand spindle (19) and thread tape. See "Threading Tape".
b). Pull tape tight against Heads (26) and (28) by rotating one reel while holding the other reel.
c). Both heads should then be positioned so the top edge of the tape is exactly even with the bottom edge of the ground down "flat" section on the face of the heads.
d). When in this position both heads should also be perpendicular to the bracket vertically and horizontally.
e). The faces of the heads should be in line with each other so as to present a flat surface to the tape, i.e. one head should not protrude further forward than the other.

3. Output Response

To make this adjustment a tape on which a 3000 cycle note has been recorded by a unit known to be in good operating condition will be required.

Connect an output meter, or AC voltmeter, across the speaker voice coil of the unit to be adjusted. While playing back the 3000 cycle note tape, pivot head (39) back and forth on mounting screw (23) until maximum amplitude on output meter is achieved. Make certain that head height has not been changed.

If a 3000 cycle tape cannot be make, use a recording with high note content to make the adjustment described above.

4. Track Overlap

This should be checked by first making a recording on a blank tape with the unit being checked.

Do not rewind the tape, merely reverse the reels and play back the other track.

There should be no sound but, if what is heard is backwards, there is track overlap. To correct this, it will be necessary to adjust the tape guide on the side of the head holder by bending it upwards. This should move the tracks further apart.

Switch Cam Adjustment

The Play-Record Switch in the amplifier chassis is normally held in the play position by a spring located on the switch arm. When cam on the end of the control shaft (70) actuates switch, it should move the switch far enough to allow all circuits to be switched from Playback to Record.

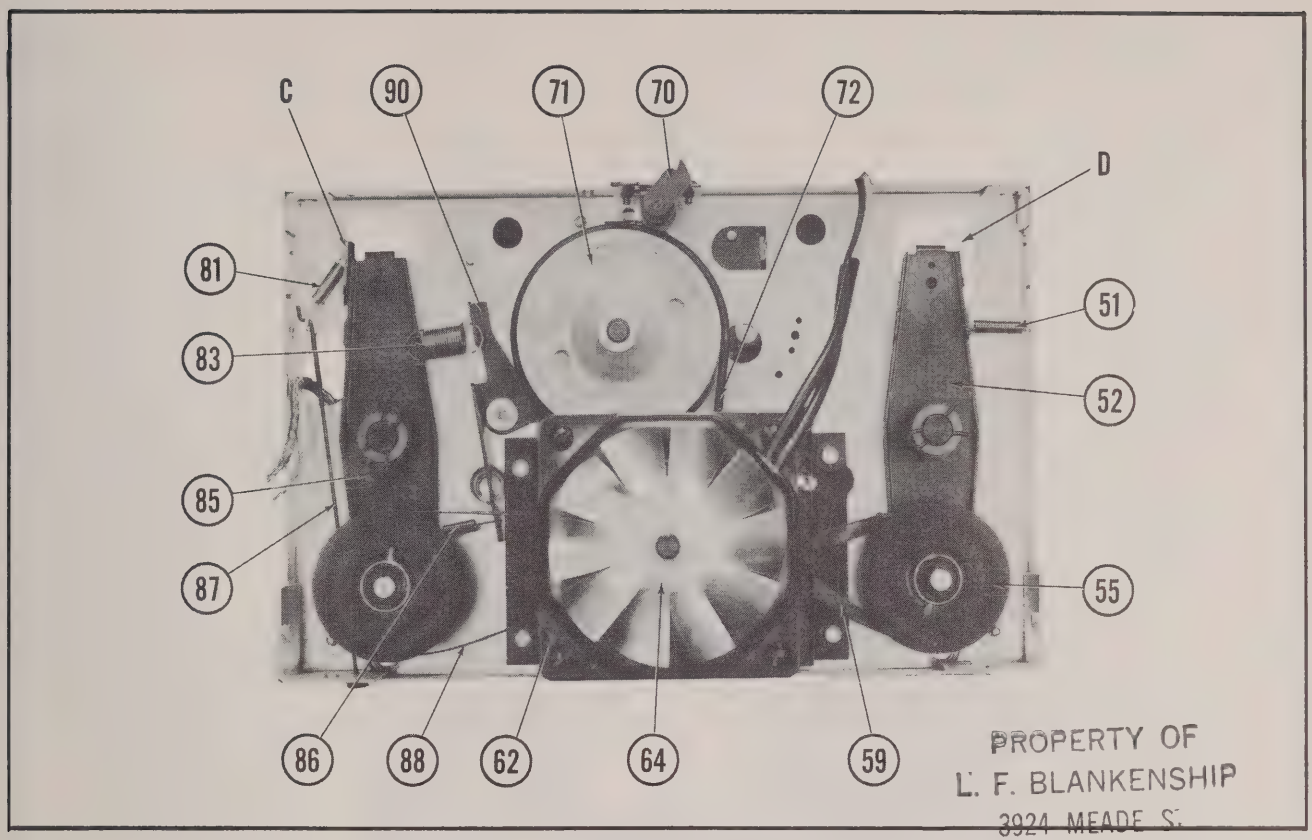


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Figure 2

If adjustment is required proceed as follows:

1. Loosen set screw (33).
2. Carefully detach one end of switch spring.
3. Push down on control knob (5) and turn it clockwise to the Record position.
4. Manually move switch cam (70) until first slide contact touches only the first two wiper contacts. At all times during this step switch cam (70) must touch switch cam at end at switch slide.
5. Move pusher stud (34) to the "Record" position and tighten set screw (33).
6. Reconnect switch spring.

Oscillator Coil Adjustment

If the oscillator coil (L1) is replaced, the setting of the adjustable slug should be checked as follows:

1. Connect a frequency meter between point 2 of the erase head and ground.
2. Turn volume and tone controls on.
3. Set the Play-Record knob (5) to the "Record" position.
4. Adjust the oscillator slug for a 52.5 Kc reading on the meter (A non-metallic screwdriver should be used for this adjustment).

Hum Balance

When either the 12AX7 tube or the Head (39) has been changed the setting of the hum balancing control should be checked. This can be done as follows:

1. Connect an A.C. V.T.V.M. across the speaker coil. The meter's lowest scale should have a .1 volt reading at full scale deflection, or at least 1/3 of full scale.
2. Turn volume control and tone control fully clockwise.
3. Set control knob (5) to the playback position.
4. Adjust the hum balance control for a minimum reading. This reading should not exceed .1 volt.

Lubrication

The lubrication applied at the time of manufacture should be sufficient for a long period of time. In cases of unusual use, high operating temperatures, or the replacement of a part, lubrication may be required. Approximately once a year lubricate as follows:

A. With No. 20 Motor Oil

1. Bushing shaft for take-up arm (85).
2. Bushing shaft for rewind arm (52).
3. Bearing for take-up spindle (48).
4. Bearing for feed spindle (19).
5. Bearing for capstan shaft and flywheel (71).
6. Shaft for pressure roller (43).

B. Staput #312 Grease or Lubriplate

1. Bearing surfaces and right guide surface of slide plate (32).
2. Pusher stud (34).
3. Bearing surfaces of indexing arm (31).

C. No Lubrication

1. Motor (62).
2. Drive surfaces of flywheel (71).
3. Drive belts, (59), (72) and (88). In the event oil is thrown on these belts, clean with a

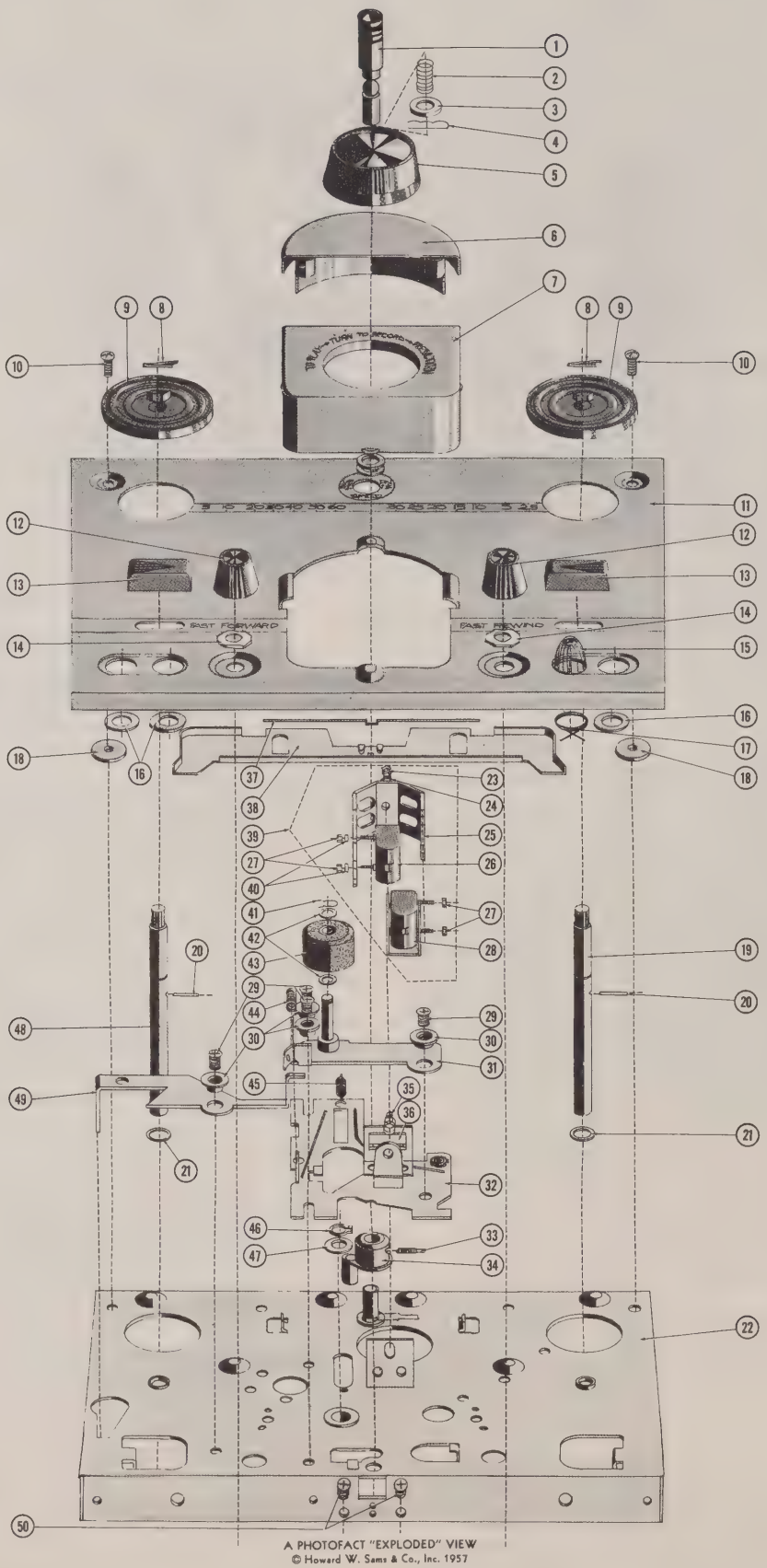


Figure 3A. Exploded View of Parts Above Baseplate

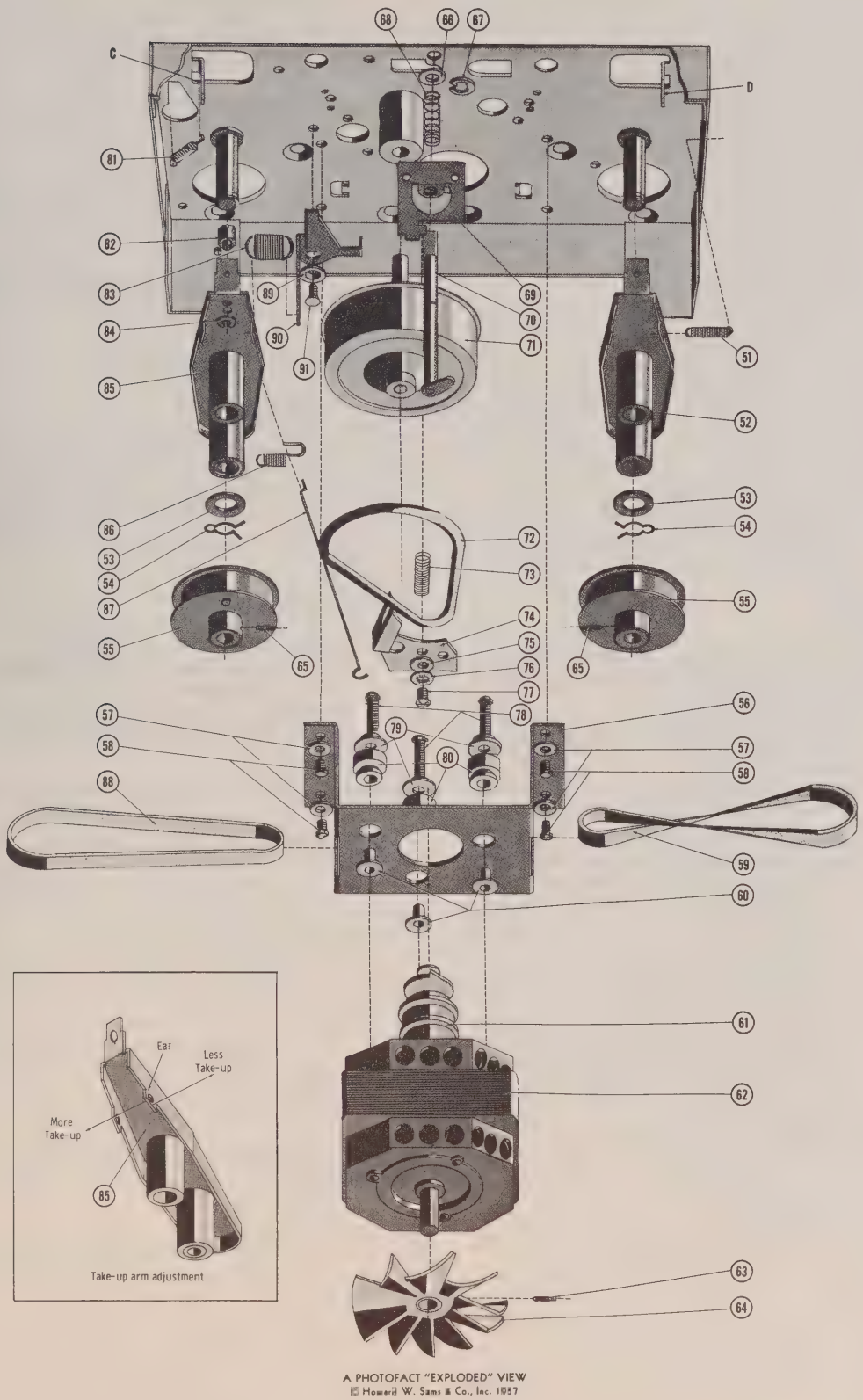


Figure 3B. Exploded View of Parts Below Baseplate

petroleum solvent.
Do Not Use Carbon-Tetrachloide.

TROUBLES

Improper Tape Take-up

1. Spindle (48) binding.
   a). Lubricate and check end play. See adjustment section "Spindle End Play".
2. Improper take-up spring (83) action.
   a). See "Take-up Lever Adjustment".
3. Drive belt slipping.
   a). Clean pulleys.
4. Broken drive belt.
   a). Replace belts. Check adjustments "Take-up Lever Adjustment" and "Take-up and Feed Reel Drag".

Fails to Fast Forward Properly

1. See above except for step 2.
   (a) See corresponding remedies above.

Fails to Fast Rewind Properly

1. See above except for step 2.
   (a) See corresponding remedies above.
   CAUTION: When replacing drive belt (59) be sure to give it a half-twist.

Stalling or Binding

1. Speed control (1) setting changed while unit not turned on. This should be done only while motor (62) is rotating.
   a). With motor (62) turned on try moving Speed Control (1) up and down several times.
   b). Should the above fail, try holding Fast Forward Control to the left as far as it will go, and with the other hand manually rotate Take-up Reel Spindle (48).
   c). If binding continues it will be necessary to remove unit from cabinet and free any binding action.

Speed Does Not Agree With Speed Setting.

1. Bent Speed Control Bracket (74).
   a). Straighten bracket (74) so that upper and lower fingers are equidistant from drive belt when belt is in normal operating position.
2. Broken "ears" on Drive Pully (61).
   a). Replace entire motor (62).

Tape Creeps Out Of Tape Slot

1. Head (93) improperly adjusted.
   a). See "Head Alignment Adjustment".

Plays Back But Does Not Record

1. Bad component.
   a). Check voltage and resistance readings.
2. Switch slide not contacting proper terminal.
   a). See "Switch Cam Adjustment".

Does Not Completely Erase Previous Recording

1. Bad 6V6GT tube.
   a). Replace tube. This tube may function properly as a power amplifier but not as an oscillator which is needed for erasing.
2. Bad Head.
   a). Replace head following "Head Alignment Adjustment".

Fails To Pull Tape Across Head

1. Slippage.
   a). Clean drive pulley (61), Capstan shaft (71) and Pressure Roller (43) surface with a petroleum solvent.
   Do Not Use Carbon-Tetrachloride.
   Replace roller (43) or rubber belt (72) if they appear to be oil sooked.

Speed Variation Or Wow

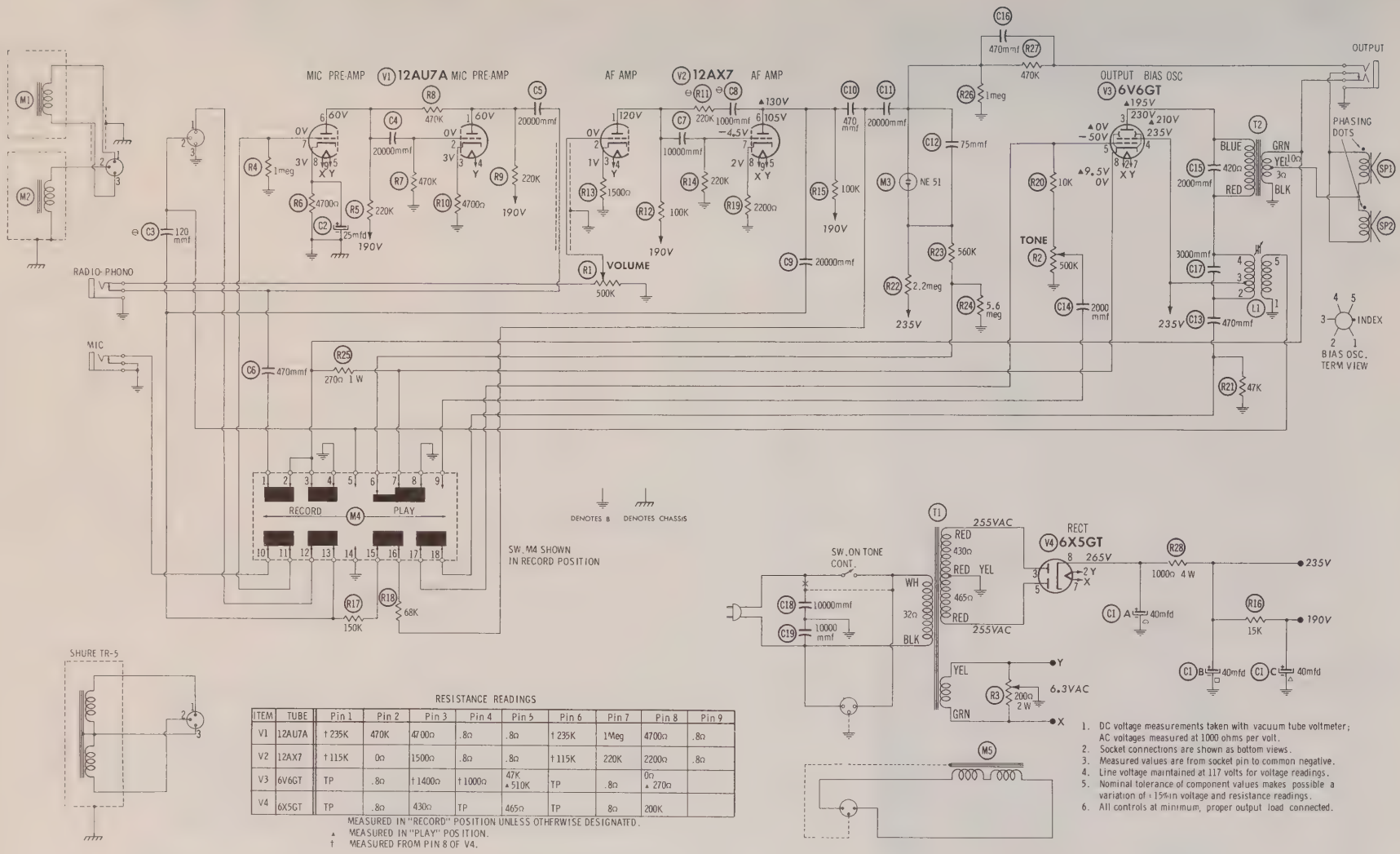
1. Too much feed reel drag.
   a). See "Take-up and Feed Reel Drag" Adjustment.
2. Tight Feed and Take-up Spindles.
   a). See "Improper Tape Take-up".

Weak Recording Or Weak Playback Or No Sound

1. Dirt on surface of Head (39).
   a). Clean surface with a clean lint free cloth which has been moistened with a petroleum solvent. Do Not Use Carbon-Tetrachloride.
2. Weak or dead head (39).
   a). Replace following "Head Alignment Adjustment".
3. Weak or dead tube.
   a). Check and replace weak tube.
4. Open "MIKE" input jack and "Radio-Phono" input jack.
   a). Check continuity.

Sound From One Track is Heard While Playing Back Second Track.

1. Track Overlap.
   a). See "Head Alignment Adjustment".



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AU7A	†235K	470K	4700Ω	.8Ω	.8Ω	†235K	1Meg	4700Ω	.8Ω
V2	12AX7	†115K	0Ω	1500Ω	.8Ω	.8Ω	†115K	220K	2200Ω	.8Ω
V3	6V6GT	TP	.8Ω	†1400Ω	†1000Ω	47K ▲510K	TP	.8Ω	0Ω ▲270Ω	
V4	6X5GT	TP	.8Ω	430Ω	TP	465Ω	TP	8Ω	200K	

MEASURED IN "RECORD" POSITION UNLESS OTHERWISE DESIGNATED.
▲ MEASURED IN "PLAY" POSITION.
† MEASURED FROM PIN 8 OF V4.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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COLUMBIA RECORDS
MODEL 560, A

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Mike & Playback Preamp.	12AU7A	
V2	AF Amp.	12AX7	
V3	Output-Bias Osc.	6V6GT	
V4	Rectifier	6X5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Columbia Records PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	300	770088	AFH4-02-10	BO450	WQ230	TMT-23	D-130	TVL-4575
B	■40	300			BR4035			FM-4540	
C	▲40	300							
C2	25	25	770003	PRS25V25	BBR25-25	TC26	TD-25-25	FM-0225	TVA-1205

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

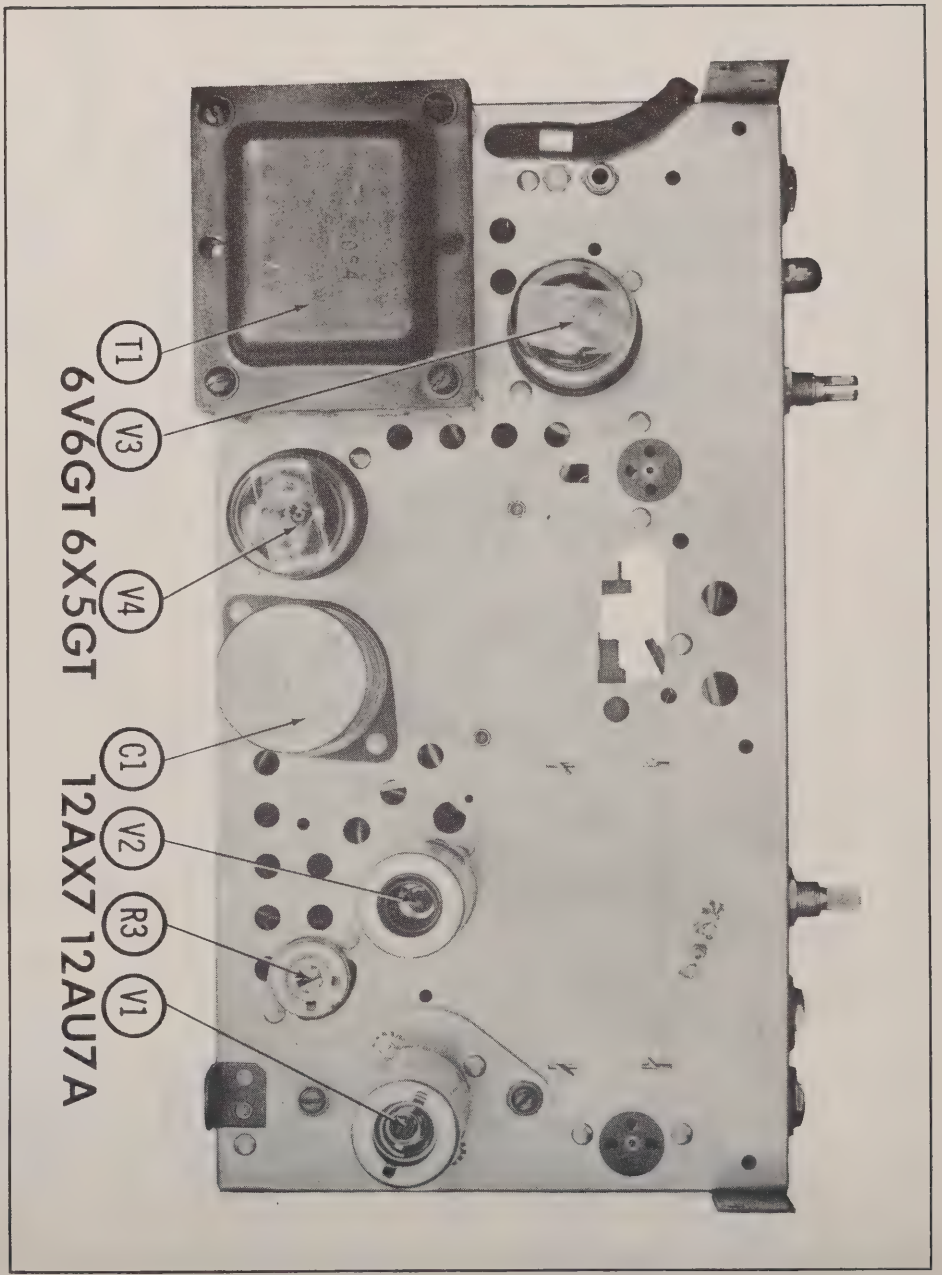
ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Columbia Records PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	120		770164	N750-SI 120	TCN-120	C10T12U	TC7-120			Note 1
C4	20000		770095	BPD-02	DD-203	BYB6S2	ED-02	GEM-612	5HK-S2	
C5	20000		770095	BPD-02	DD-203	BYB6S2	ED-02	GEM-612	5HK-S2	
C6	470		770090	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C7	10000		770096	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C8	1000		770140	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	Note 2
C9	20000		770095	BPD-02	DD-203	BYB6S2	ED-02	GEM-612	5HK-S2	
C10	470		770090	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C11	20000		770095	BPD-02	DD-203	BYB6S2	ED-02	GEM-612	5HK-S2	
C12	75		770097	SI 75	DD-750	L10Q75	ED-75	UC-5475	5GA-Q75	
C13	470		770090	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C14	2000	1000	770110	P1088N-002	DD-202	BYA10D2		GEM-1022	10TM-D2	
C15	2000	1000	770110	P1088N-002	DD-202	BYA10D2		GEM-1022	10TM-D2	
C16	470		770090	BPD-00047	DD-471	BYA10T47	ED-470	UC-5447	5GA-T47	
C17	3000			1467-003	DD-302	1W5D33	ED-003	UC-523	1FM-23	
C18	10000	1500	770105	P1688N-01	DD16-103	CUB10S1		GEM-1611	16TM-S1	
C19	10000	1500	770105	P1688N-01	DD16-103	CUB10S1		GEM-1611	16TM-S1	

Note 1. Some versions of this model may use a 75MMF, 600V ceramic disc (10%) (Part #770097) in this application.
Note 2. Some versions of this model may use a 750MMF, 600V ceramic disc (10%) (Part #770094) in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Columbia Records PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	740051	B-60	A47-500K-Z	Q13-133	U48	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2A	500K	½	740052	B-60	A47-500K-Z	Q13-133	U48	Tone
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1	SWE-12	76-1	US-26	
R3	200Ω	2	740045					Hum balance-wire wound

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Columbia Records PART No.	IRC PART No.	
R4	1Meg		760001	BTS-1Meg	
R5	220K		760036	BTS-220K	
R6	4700Ω		760017	BTS-4700	
R7	470K		760037	BTS-470K	
R8	470K		760037	BTS-470K	
R9	220K		760036	BTS-220K	
R10	4700Ω		760017	BTS-4700	
R11	220K		760036	BTS-220K	Note 1
R12	100K		760010	BTS-100K	
R13	1500Ω		760003	BTS-1500	
R14	220K		760036	BTS-220K	
R15	100K		760010	BTS-100K	
R16	15K		760027	BTS-15K	
R17	150K		760064	BTS-150K	
R18	68K		760062	BTS-68K	
R19	2200Ω		760047	BTS-2200	
R20	10K		760019	BTS-10K	
R21	47K		760013	BTS-47K	
R22	2.2Meg		760040	BTS-2.2Meg	
R23	560K		760039	BTS-560K	
R24	5.6Meg		760054	BTS-5.6Meg	
R25	270Ω	1	760115	BTA-270	
R26	1Meg		760001	BTS-1Meg	
R27	470K		760037	BTS-470K	
R28	1000Ω	4	760304	PW4-1000	

Note 1. Some versions may use a 270K resistor.

COILS

ITEM No.	USE	REPLACEMENT DATA				NOTES
		Columbia Records PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Bias Osc.	700080				Includes C17

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	Columbia Records PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @.37A	480VCT .056A	6.3V @1.6A		700054	P9213	P-3048	PM-8419	26R31U	R-8B ①

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Columbia Records PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5000Ω	3-4Ω tap @ 1.6Ω	700071			A-3825①			① Drill one new mounting hole.

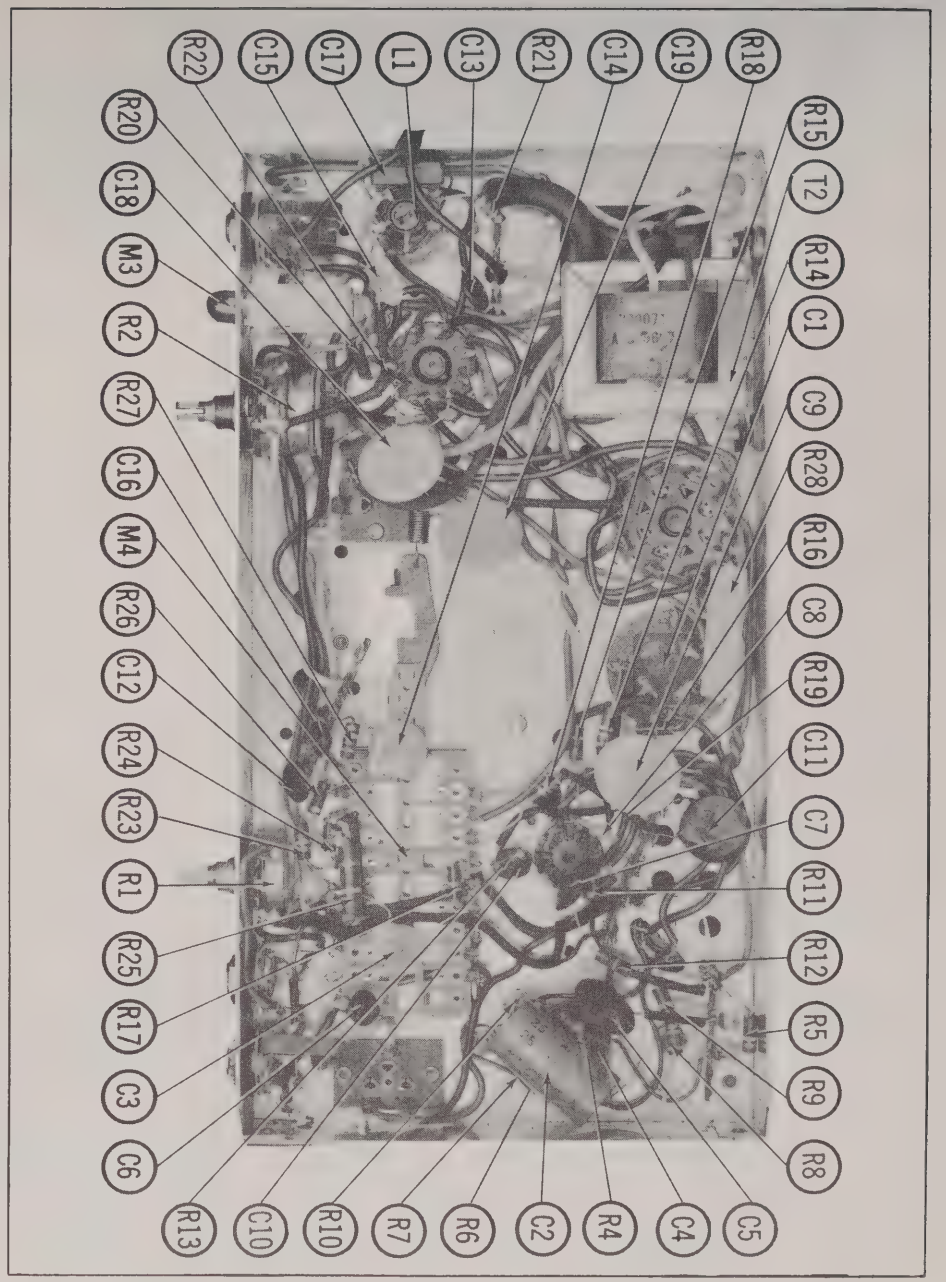
SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Columbia Records PART No.	QUAM PART No.	
SP1	5"	PM	3-4Ω	013041 ① ②	5A07 ①	① Parallel and phase.
SP2	5"	PM	3-4Ω	013041 ① ②	5A07 ①	② Alternate part #013383

MISCELLANEOUS

ITEM No.	PART NAME	Columbia Records PART No.	NOTES
M1	Record Head	720151	
M2	Erase Head	720152	
M3	Neon Lamp	730006	NE51
M4	Switch	011301	Record-Play
M5	Motor	011692	
	Knob	310477	Record-Play
	Knob	310475	On-off tone, volume
	Escutcheon	130131	Front Plate
	Cabinet	440416	Includes lid, vent screen

CHASSIS—BOTTOM VIEW



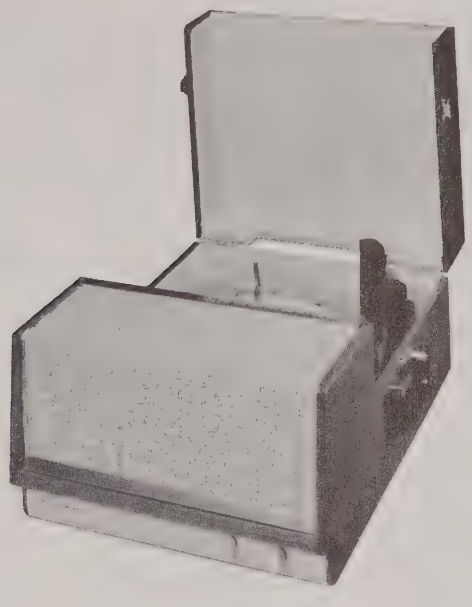
MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1	011693	Speed Control, Includes knob & shaft
2	420151	Spring, Two speed control (Upper)
3	320054	Washer, rubber
4	420152	Retainer, Speed Control Shaft
5	310477	Knob, Play-Record Control
6	100920-066	Head Cover, Has knurled tape guides
7	450235	Cover
8	460165	Retainer for Reel Holder (2)
9	012372-6	Reel Holder (2)
10	600242	Screw, Top Plate Mounting (2)
11	100920-066	Top Plate
12	310475	Knob, Volume, and On-off-Tone (2)
13	310476	Knob, Fast Forward and Fast Rewind (2)
14	590021	Hex Nut, #3/8-32 (2)
15	310158	Jewel
16	580132-1	Washer, Fiber (3)
17	420111	Jewel Retaining Spring
18	580037	Washer, Flat (2)
19	011319	Feed Spindle, Includes Roll Pin (1)
20	460228	Roll Pin (2)
21	580141	Washer, Special Steel (See Note A)
22	012383	Base Plate, Includes Staked and Riveted Parts
23	600137	Head Retaining Screw
24	580056	Washer, Flat
25	120041	Head Bracket
26	720151	Record Head (M.M.3M-20)
27	590052	Hex Nut (4)
28	720152	Erase Head (M.M.7 EM12)
29	600243	Screw, 6-32 x 1/4 Phil. Flat Head (4)
30	200288	Washer, Slide Button Spacer(4)
31	012328	Pressure Roller Arm
32	012327	Pressure Plate Assy.(Inc. items 29(3), 30(3), 31, 35, 36, 41, 42, 43, 44 & 45
33	600247	Screw, Set, 6-32 x 3/8", "Slab Head"
34	012330	Pusher Stud, Includes set screw (item 33)
35	420104	Spring, Pressure Shoe
36	012907	Pressure Shoe, Includes felt pad (Model 560A)
36A	011316	Pressure Shoe, Includes felt pads (Model 560) (Not Shown)
37	420177	Brake Plate Spring
38	100880	Brake Plate
39	013392	Head Assy., Includes bracket, cable and plug (Model 560A)
39A	011311	Head (Shure) , Incl. Head holder, cable and plug (Model 560) (Not Shown)
40	580230	Washer, Flat (2)
41	460111	Retainer, Pressure Roller
42	580143	Washer, Cloth (2)
43	011236	Pressure Roller
44	420174	Capstan Pressure Spring
45	420171	Spring, Slide Plate Return
46	460018	Retainer, Capstan and Flywheel
47	580141	Washer, Special, Capstan & Flywheel (See Note A)
48	011319	Take-up Spindle, Incl. Roll Pin (1)
49	101015	Lever, Foot SW
50	600111	Screw, Mounts Control Shaft (2)
51	420173	Spring, Spindle Arm
52	011330	Rewind Arm
53	580156	Washer, Special Steel (2) (See Note A)
54	460110	Retainer (2)
55	011317	Spindle Pulley (2) Incl. Set screw (Item 65)
56	011739	Bracket, Motor Mount
57	580056	Washer (4)
58	600256	Screw (4)
59	490089	Rewind Drive Belt
60	320018	Spacer, Motor Mounting (3)
61		Drive Pulley (Part of Motor) (Note B)
62	011692	Motor, 115V., 60 Cycles, Incl. pulley (61), cable & plug
63	600213	Screw, Set, 8-32 x 3/16" "Allen", for fan
64	011321	Fan, Motor, Incl. set screw (63)
65	600247	Screw, Set, 6-32 x 3/8" "Slab Head" (2)
66	320059	Washer, rubber
67	460117	Retainer, Control Shaft
68	420109	Spring, Record Release
69	100660	Control Shaft Bracket
70	012324	Control Shaft, Incl. switch cam
71	011694	Capstan, Shaft & Flywheel
72	490087	Rubber Belt, Capstan Drive
73	420151	Spring, Two Speed Control (Lower)
74	100760	Speed Control Bracket
75	580213	Washer, Flat
76	580019	Lockwasher
77	600242	Screw, (6-32 x 1/4 Phillips Pan Head)
78	600245	Screw, Motor Mounting (3)
79	580151	Washer, Motor Mounting (3)
80	320053	Rubber Bushing, Motor Mounting (3)
81	420181	Foot Switch Return Spring
82	200403	Foot Switch Adjust. Cam
83	420186	Take-up Spring
84	580082	Retainer, Foot Switch Adjust. Cam
85	011329	Take-up Arm
86	420172	Brake Spring, Left
87	100967	Foot Switch Linkage Wire
88	490089	Take-up Drive Belt
89	200288	Washer, Slide Button Spacer
90	100809	Take-up Lever
91	600243	Screw

Note A: One or two washers may be used in this location.

Note B: Drive Pulley (61) can not be obtained separately as it is turned on the individual motor shaft.

CRESCENT
MODEL A-644

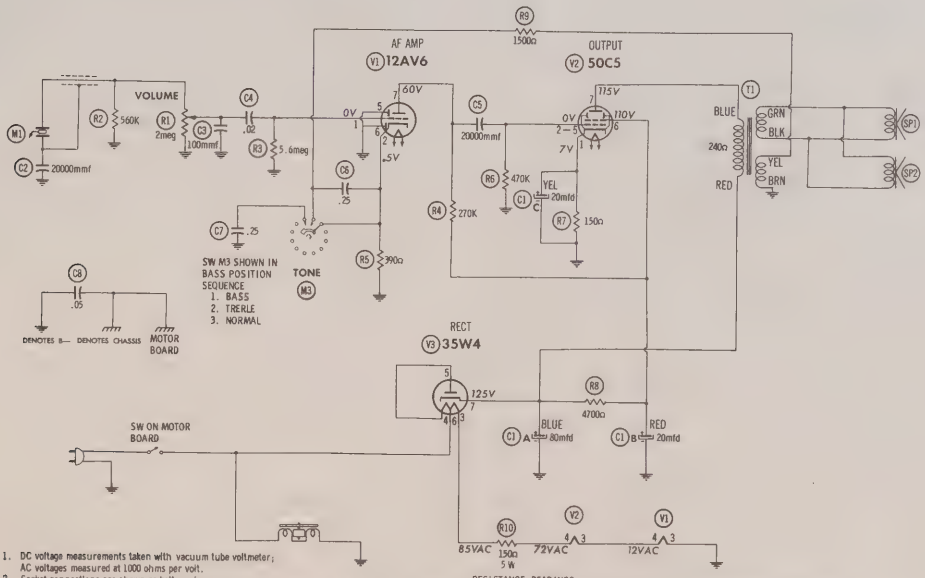


PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CRESCENT
MODEL A-644

TRADE NAME	Crescent Model A-644
MANUFACTURER	Crescent Industries, Inc., 5900 W. Touhy Ave., Chicago 31, Ill.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Automatic Record Changer
TUBES (Three)	Types 12AV6 AF Amplifier, 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles RATING .25 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE CRESCENT 500 SERIES - PHOTOFACT SET 197 - FOLDER 4 OR RECORD CHANGER MANUAL CM-5.



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12AV6	5.6Meg	390Ω	0Ω	12Ω	0Ω	0Ω	†275K
V2	50C5	150Ω	470K	12Ω	72Ω	470K	†4700Ω	†240Ω
V3	35W4	NC	TP	225Ω	260Ω	260Ω	250Ω	15K

† MEASURED FROM PIN 7 OF V3
NC NO CONNECTION
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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363-7

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	12AV6	
V2	Output	50C5	
V3	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA CRESCENT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	80	150	770125	PRS150/25V	BBRQ53215C				R2318 *
B	20	150		8040/20					
C	20	25							

* Non catalog item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA CRESCENT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	20000			BPD-02	DD-203	K085	ED-02	GEM-412	5HK-S2	
C3	100			DI-0001	DD-101	G042	ED-100	UC-531	5GA-T1	
C4	.02	200		BPD-02	DD-203	CUB2S2	ED-02	GEM-412	2TM-S2	
C5	20000			BPD-02	DD-203	K085	ED-02	GEM-412	5HK-S2	
C6	.25	200		P288N-25		CUB2P25		GEM-4025	2TM-P25	
C7	.25	200		P288N-25		CUB2P25		GEM-4025	2TM-P25	
C8	.05	200		BPD-05	DF-503	CUB2S5		GEM-415	2TM-S5	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CRESCENT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	2Meg	½	740060					Volume

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CRESCENT PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R2	560K			BTS-560K	
R3	5.6Meg			BTS-5.6Meg	
R4	270K			BTS-270K	
R5	390Ω			BTS-390	
R6	470K			BTS-470K	
R7	150Ω			BTS-150	
R8	4700Ω			BTS-4700	
R9	1500Ω			BTS-1500	
R10	150Ω	5		PW7-150	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA CRESCENT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2300Ω	1.7Ω	700081						

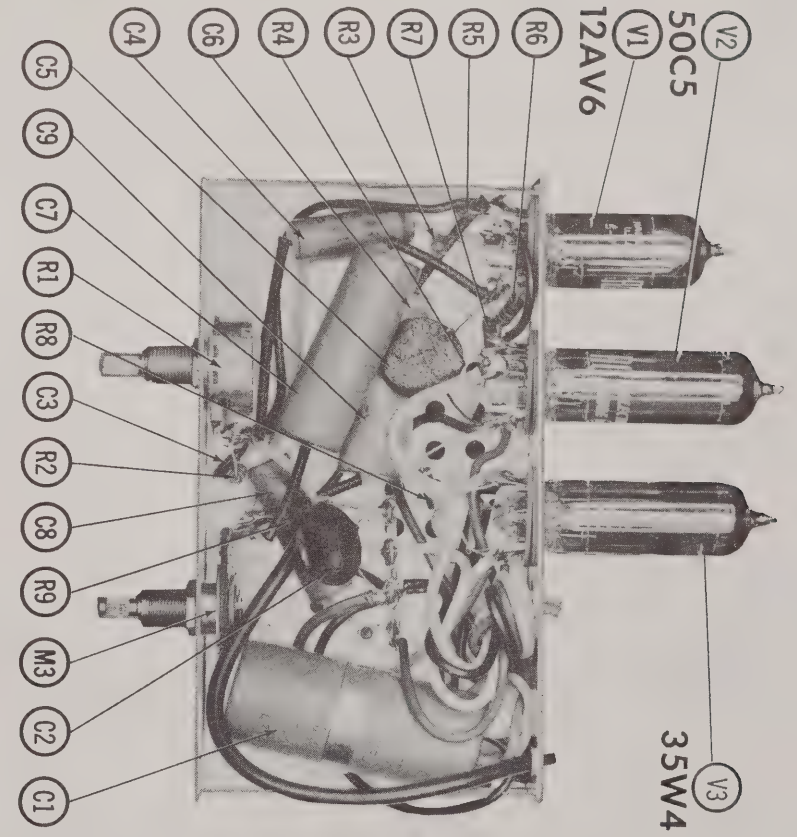
SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA CRESCENT PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	6½"	PM	3-4Ω	012225	6A21	
SP2	6½"	PM	3-4Ω	012226	6A21	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA CRESCENT PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. MOUNT	REMARKS
M1	720044	55-T	GD-J	56	PT-2	

CHASSIS—BOTTOM VIEW



PHONO NEEDLE

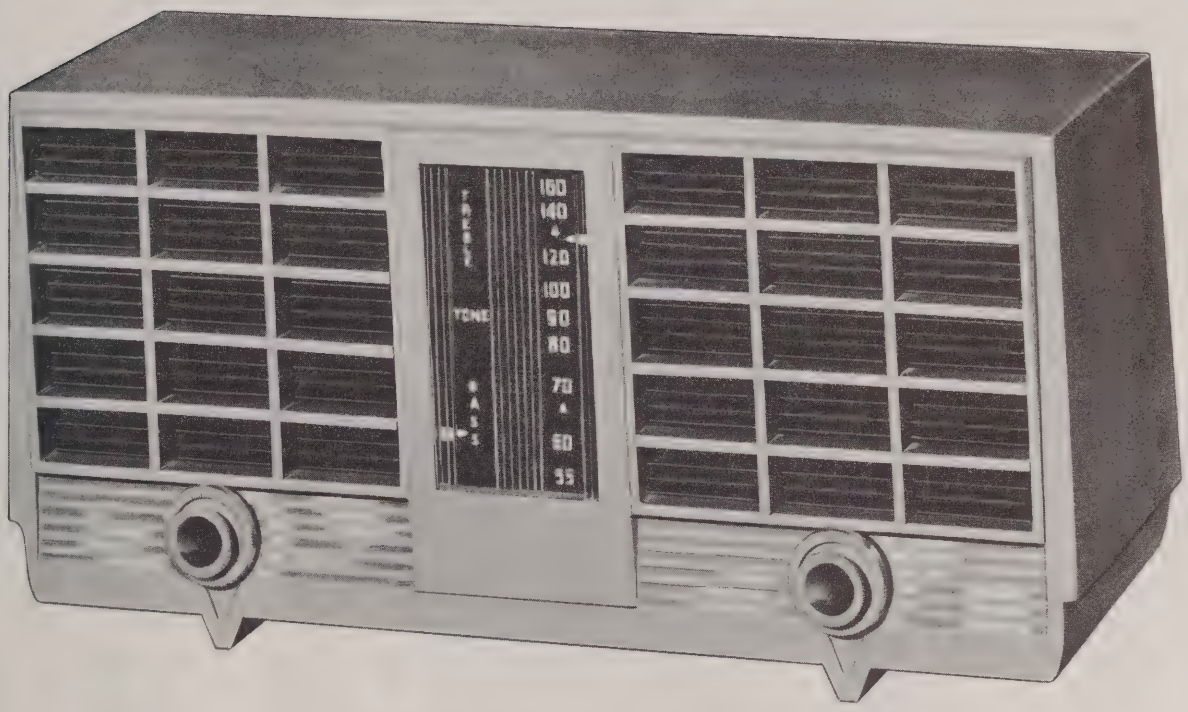
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA CRESCENT PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M2	720055	† S-66 or ♦† S-66SD or ♦ S-66D	† W-75TPS or ♦† W-75DS or ♦ W-75TPD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	CRESCENT PART No.	NOTES
M3	Switch	740069	Tone (SP-3 Position, Rotary, wafer type)
	Knob	310330	Motor Speed Control
	Knob	310334	On-Off-Reject
	Knob	310326	Volume & Tone

FIRESTONE
MODEL 4-A-153 (Code 382-6-406)



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

FIRESTONE
MODEL 4-A-153 (Code 382-6-406)

TRADE NAME	Firestone Model 4-A-153 (Code 382-6-406)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Parkway, Akron, Ohio
TYPE SET	AC-DC Operated AM Receiver
TUBES (Six)	Types 6BJ6 RF Amplifier, 12BE6 Converter, 6BJ6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC RATING .31 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC - 1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver in in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1670KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	1400KC	Tune to 1400KC signal	"	A6, A7	"
4.		"	600KC	Tune to 600KC signal	"	A8, A9	Adjust for maximum output while rocking tuning gang.

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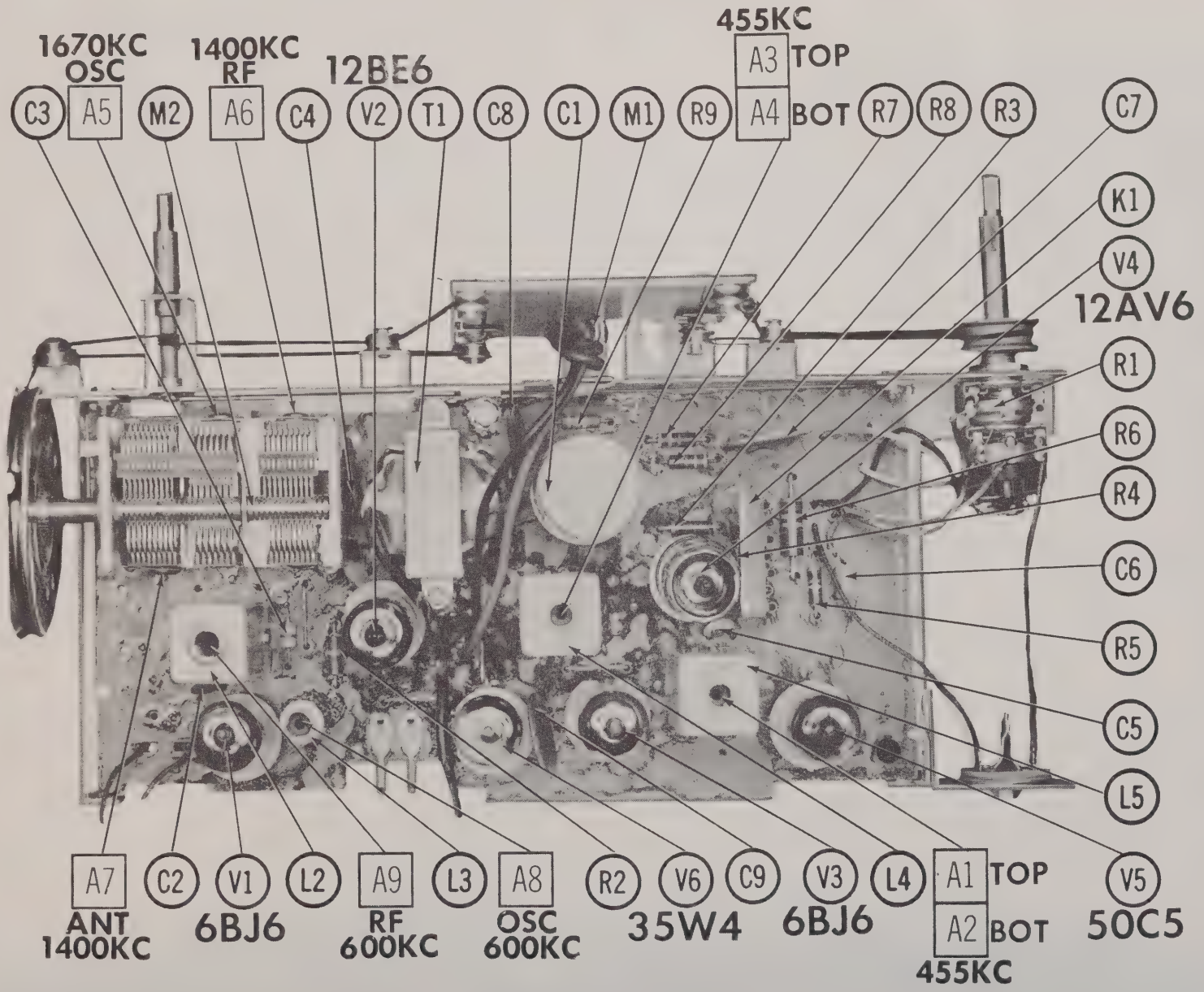


CHASSIS-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6BJ6	
V2	Converter	12BE6	
V3	IF Amplifier	6BJ6	
V4	Det.-AVC-AF Amplifier	12AV6	
V5	Output	50C5	
V6	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA FIRESTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■50	150	43711-3	AFH3-09	CO080	FP311.55	TMD-12	T-040	R2337 *
B	20	150					TD-20-150		
C	▲30	150							

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	100				TCL-100					
C3	2.2			NP0-SI 2.2	TCZ-2R2	Z006	TCO-2.2		5TCCB-V22	
C4	20000			BPD-02	DD-203	K085	ED-.02		5HK-S2	
C5	150			BPD-00015	DD-151	G046	ED-150	UC-5315	5GA-T15	
C6	2000			BPD-002	DD-202	K072	ED-002	DC-522	5HK-D2	
C7	15000			BPD-015	DF-153		ED-015		5HK-S15	
C8	20000			BPD-02	DD-203	K085	ED-02		5HK-S2	
C9	20000			BPD-02	DD-203	K085	ED-02		5HK-S2	

CONTROLS

ITEM No.	RATING RESIST-ANCE	RATING WATTS	REPLACEMENT DATA FIRESTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg		44011	F1-52			UF16A	Tone
B	500K			R2-41			UR55A	Volume
C	Switch			KB-1			US-26	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA FIRESTONE PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R2	22K			BTS-22K	
R3	1Meg			BTS-1Meg	
R4	47K			BTS-47K	
R5	100Ω			BTS-100	
R6	12K	1		BTA-12K	
R7	330Ω			BTS-330	
R8	330Ω			BTS-330	
R9	330K			BTS-330K	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2.9K	3-4Ω	42700-13	Z1004 ①	A-3025	A-3332	26S58 ①	S-12X	① Fabricate mounting.

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA FIRESTONE PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	5"	PM	6Ω	43365-2	5A1Z6	
SP2	5"	PM	6Ω	43365-2	5A1Z6	

COILS (RF-IF)

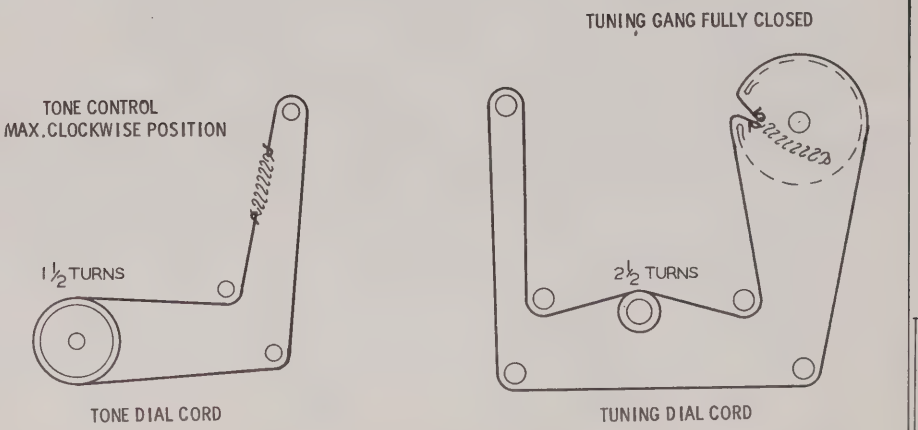
ITEM No.	USE	REPLACEMENT DATA FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Loop Stick	44038-2				Includes cabinet back
L2	RF Coil	43829-1				
L3	Osc. Coil	43644-3				
L4	Input IF	43669-1		BC-356	13-PC1	
L5	Output IF	43669-1		BC-357	13-PC2	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	FIRESTONE PART No.	REPLACEMENT DATA
K1	Detector-Audio Network	220MMF 6.8Meg 5000MMF 470K 5000MMF 470K 125MMF 125MMF	43743-2	Aerovox PA-512 Centralab PCT-158 Sprague DT-5

MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M1	Dial Light		#44
M2	Tuning Gang	43827	3 Gang
	Cabinet Assy.	44105-2	Ivory (Includes crystal)
	Cabinet Assy.	44105-11	Coral (Includes crystal)
	Knob	44232-2	Ivory (Front)
	Knob	44232-11	Coral (Front)
	Knob	43852-2	Ivory (Rear)
	Knob	43852-11	Coral (Rear)
	Pointer	43945	

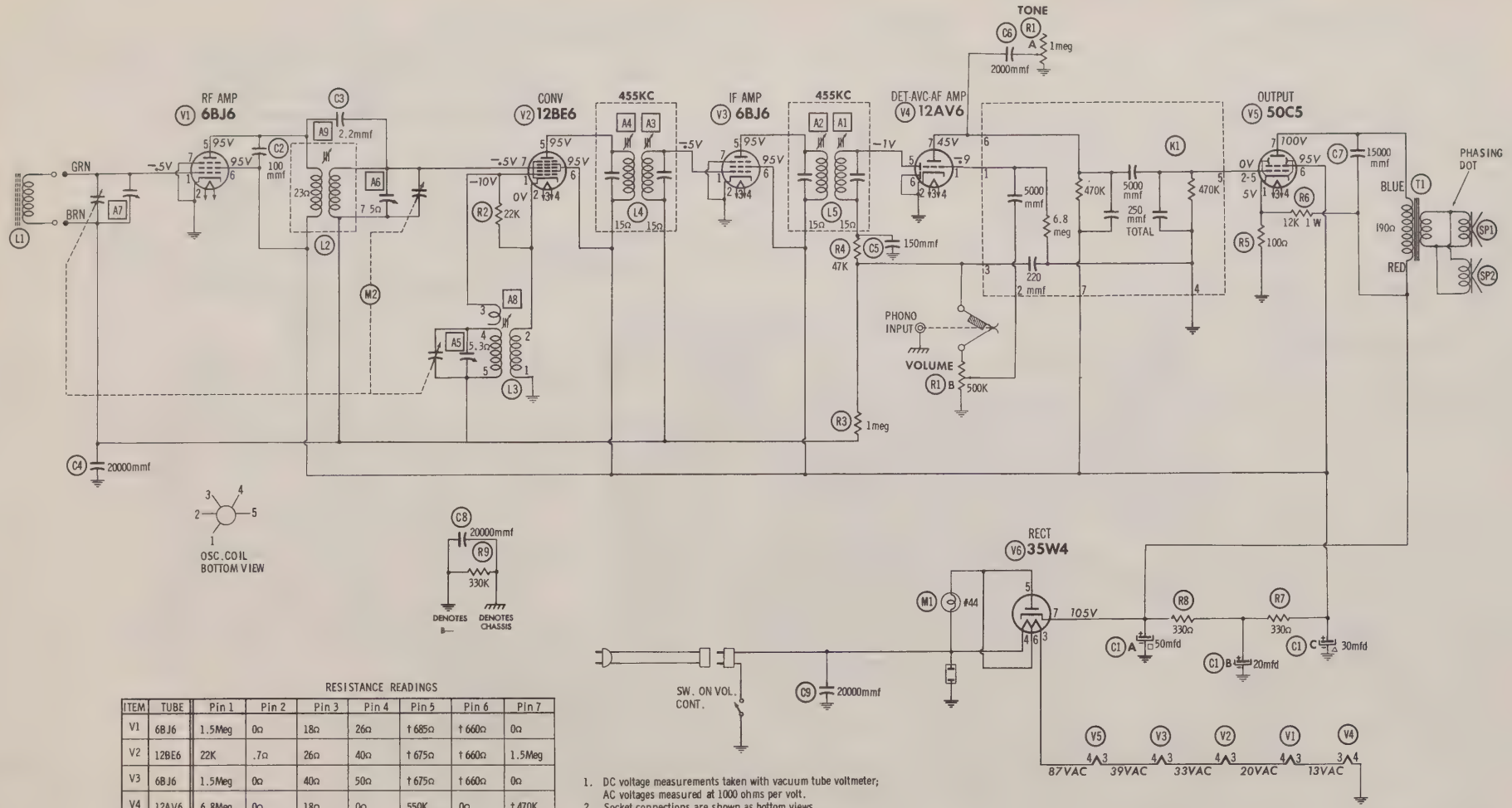


DIAL CORD STRINGING

SET 363 FOLDER 8

FIRESTONE MODEL 4-A-153

FIRESTONE MODEL 4-A-153



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	6BJ6	1.5Meg	0Ω	18Ω	26Ω	†685Ω	†660Ω	0Ω
V2	12BE6	22K	.7Ω	26Ω	40Ω	†675Ω	†660Ω	1.5Meg
V3	6BJ6	1.5Meg	0Ω	40Ω	50Ω	†675Ω	†660Ω	0Ω
V4	12AV6	6.8Meg	0Ω	18Ω	0Ω	550K	0Ω	†470K
V5	50C5	100Ω	470K	50Ω	90Ω	470K	†660Ω	†190Ω
V6	35W4	NC	TP	90Ω	150Ω	140Ω	140Ω	40K

† MEASURED FROM PIN 7 OF V6.
NC NO CONNECTION.
TP TIE POINT.

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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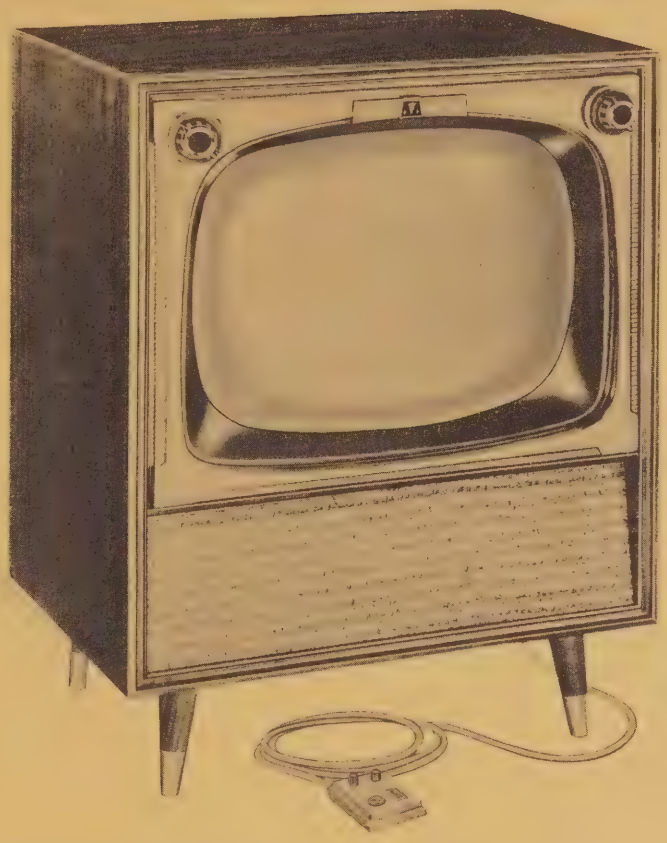

TRADE NAME	Firestone Model 13-G-224 (Code 334-6-N66/A)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Parkway, Akron, Ohio
TYPE SET	Television Receiver
TUBES	Sixteen
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 160 Watts, 1.35 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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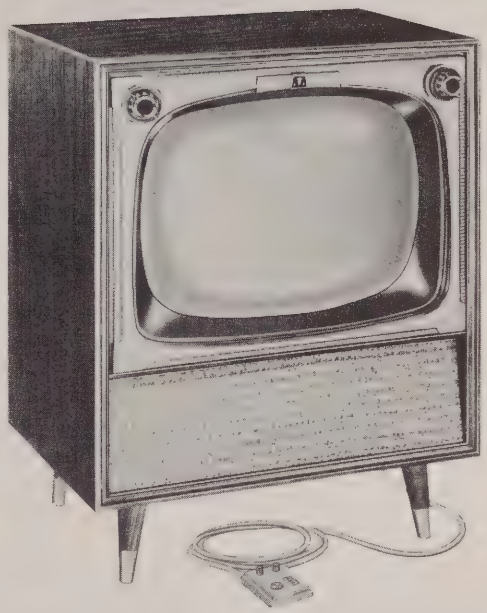
FIRESTONE MODEL 13-G-224
(Code 334-6-N661A)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 wood screws, 1 metal screw and the rear cover.
2. Remove 2 speaker leads.
3. Loosen 2 wood screws and remove the antenna terminal board.
4. Remove 2 wood screws holding remote control switch.
5. Remove 2 metal screws holding chassis rails to brackets at the bottom of the cabinet. (In replacing chassis, replace these screws first.)
6. Remove 2 metal screws holding chassis rails at the top.
7. Remove the chassis, picture tube, etc., out the front by pulling at the bottom of the mask assembly until able to remove by handling chassis rails.
8. Remove 2 speaker nuts and the speaker.



CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS

Care should be exercised when connecting test equipment or physcially contacting chassis.

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SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the channel selector and fine tuning knobs. Set the fine tuning at the center of its range. The adjustments are accessible, one at a time, as the channel selector is rotated. Adjust for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

1. Remove name plate by prying off.
2. Remove 2 metal screws holding safety glass clamp.
3. Remove safety glass.

FOCUS

Adjust the Ion trap for the best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Tune in a picture and turn the horizontal hold control fully clockwise. Adjust horizontal frequency slug (B1) until picture is just about to tear out of sync. Return horiz. hold control to center of its range. (For location see tube placement chart.)

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate audio detector buzz, adjust the buzz control for MINIMUM buzz and maximum sound. (For location see tube placement chart.)

FUSES

An overload circuit breaker is used for LV power supply protection. (For location see tube placement chart.)

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

FIRESTONE MODEL 13-G-224
(Code 334-6-N661A)

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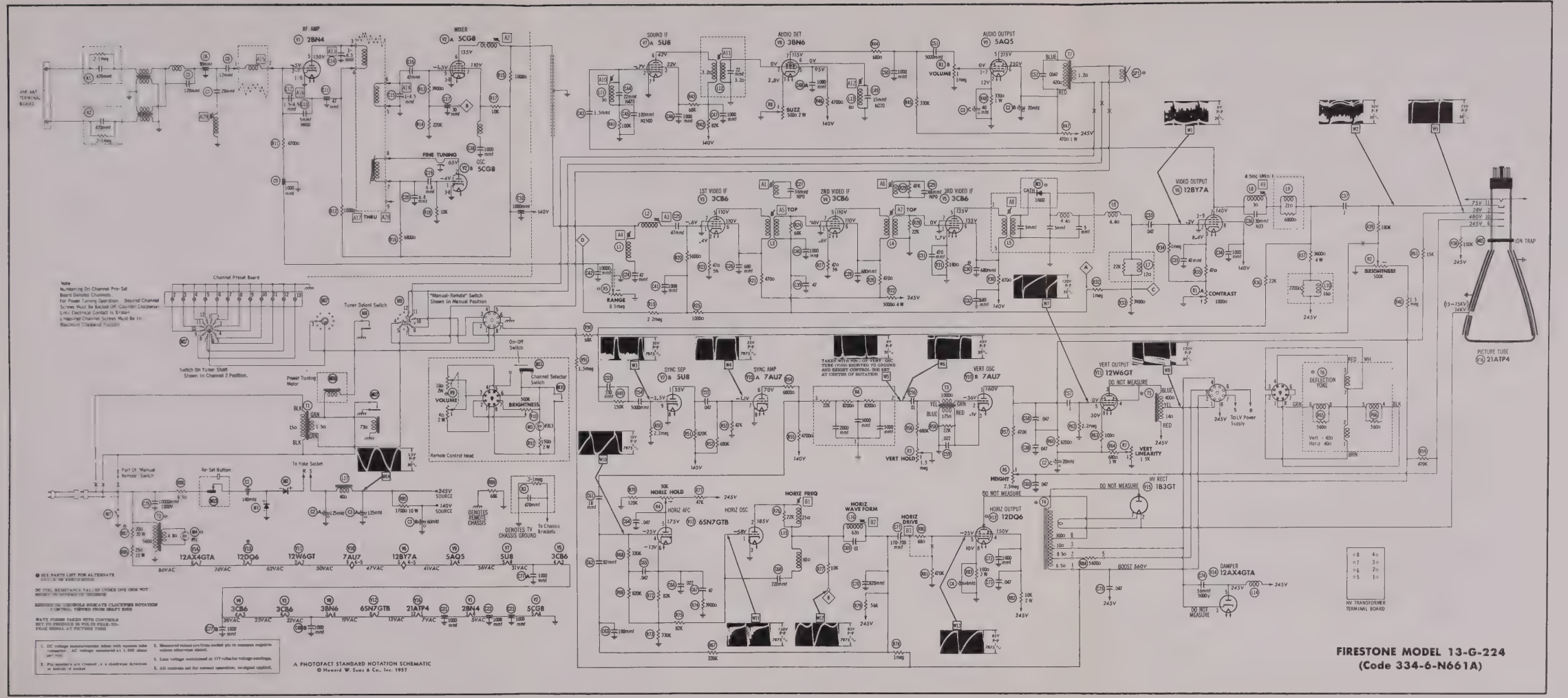
FIRESTONE MODEL 13-G-224
(Code 334-6-N661A)
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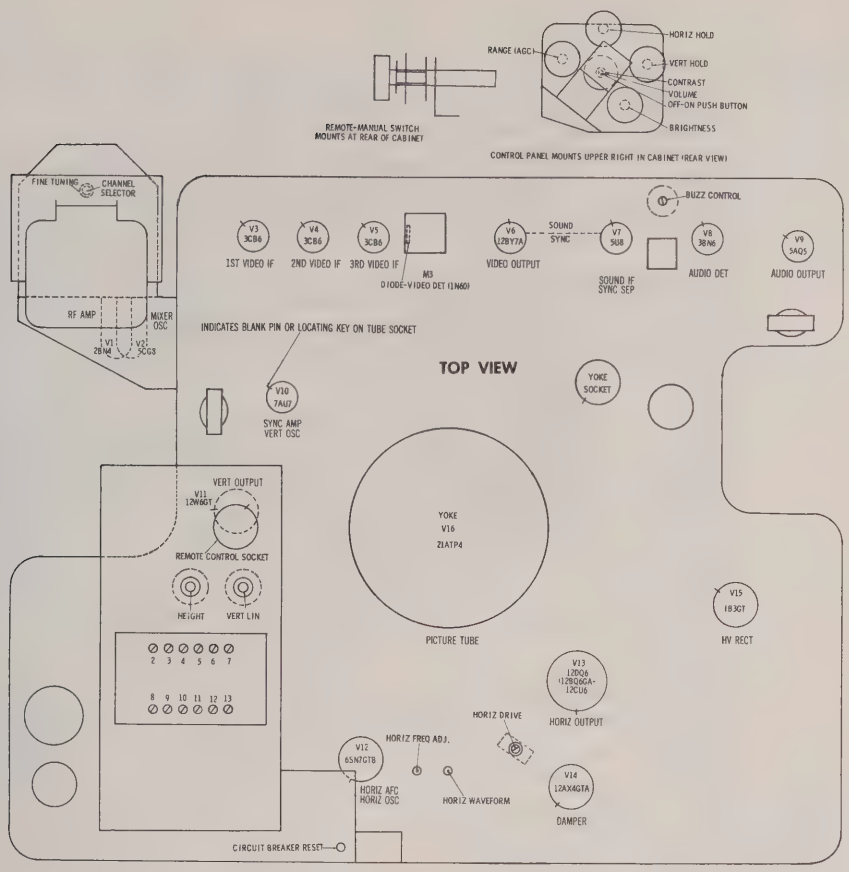
RF AMP
MIXER
SOUND IF
AUDIO DET
AUDIO OUTPUT
1ST VIDEO IF
2ND VIDEO IF
3RD VIDEO IF
VIDEO OUTPUT
SYNC SEP
SYNC AMP
VERT OSC
VERT OUTPUT
HORIZ OSC
HORIZ AFC
HORIZ FREQ
HORIZ WAVE FORM
HORIZ DRIVE
HORIZ OUTPUT
HV RECT
DAMPER
ION TRAP
PICTURE TUBE
Channel Preset Board
Tuner Detent Switch
"Manual-Remote" Switch Shown in Manual Position
On-Off Switch
Channel Selector Switch
Power Tuning Motor
Switch On Tuner Shaft Shown in Channel 2 Position.
Part Of "Manual Remote" Switch
Re-Set Button
To Yoke Socket
Remote Control Head
DENOTES REMOTE CHASSIS
DENOTES TV CHASSIS GROUND
To Chassis Brackets
DEFLECTION YOKE
To LV Power Supply
HV TRANSFORMER TERMINAL BOARD
DO NOT MEASURE
12AX4GTA
12DQ6
12W6GT
7AU7
12BY7A
5AQ5
5U8
3CB6
3CB6
3BN6
6SN7GTB
21ATP4
2BN4
5CG8

TUBE PLACEMENT CHART



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TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

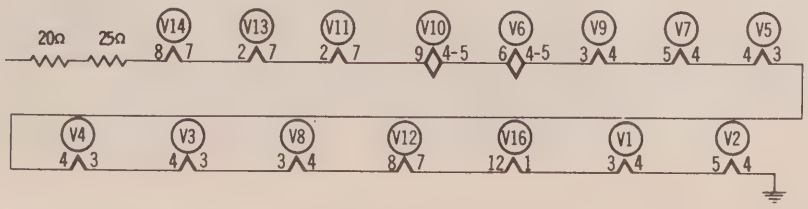
POWER SUPPLY FAILURE
No raster, no sound - **Overload (M13), Rectifier (M1, M2)**

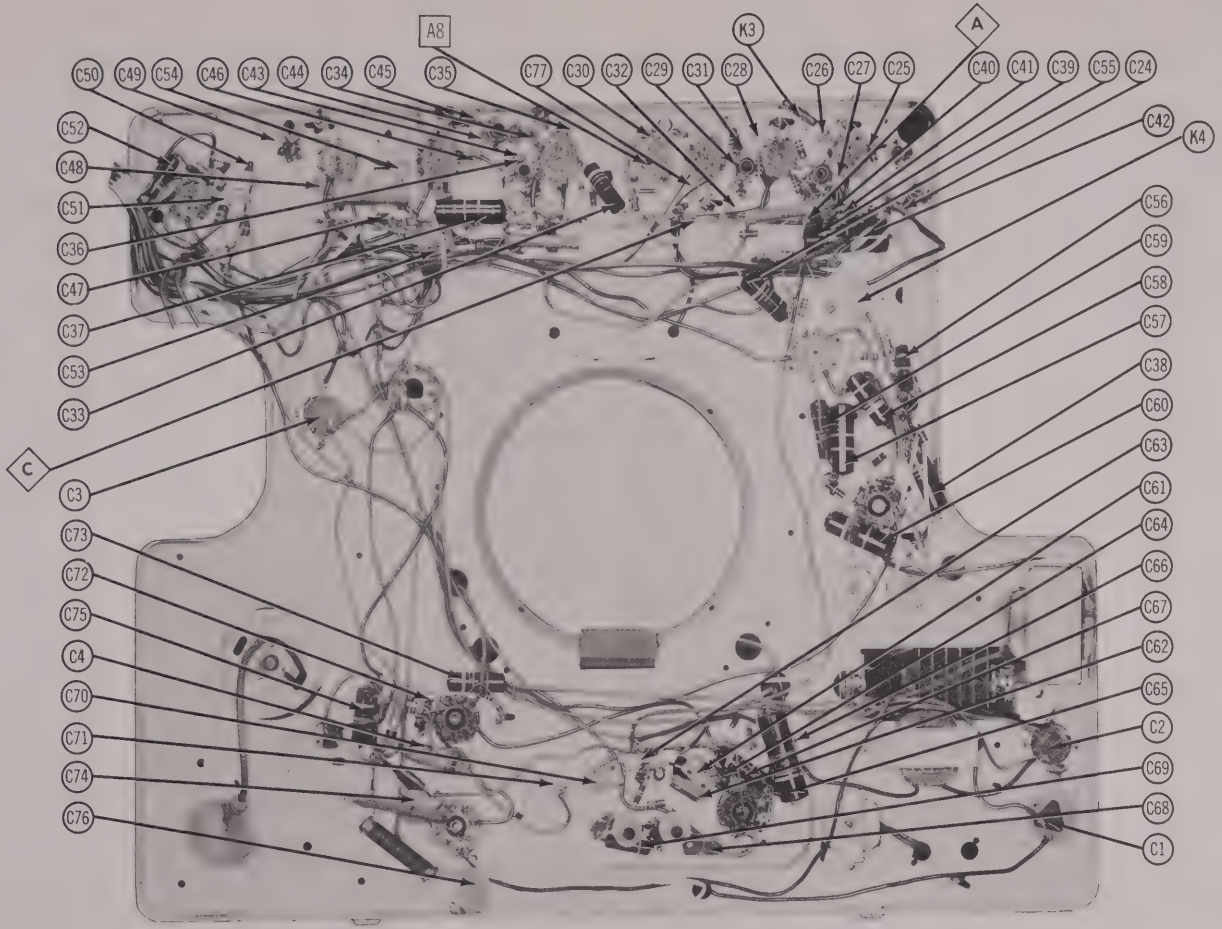
LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, V5, Diode (M3), V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V16**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V7, V10**
No horiz. sync - **V7, V10, V12**
No vert. or horiz. sync - **V7, V10**

SWEEP FAILURE
No raster, has sound - **V12, V13, V14, V15, V16**
No vertical deflection - **V10, V11**
Poor vert. linearity or foldover - **V10, V11**
Poor horiz. linearity or foldover - **V12, V13, V14**
Narrow picture - **V12, V13, V14, M1, M2**
Vert. off freq. - **V10**
Horiz. off freq. - **V12**

This receiver employs tubes used in a series filament network, an open filament in any tube in the series will cause the set to be inoperative. (See circuit below.)





CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5 volt bias supply to point (A). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	1000MMF ceramic capacitor	High side to point (B). (Use ungrounded tube shield on UHF receivers) Low side to chassis.	44.0MC (10MC Swp)	47.25MC	Any non-interfering channel.	Vert. amp. thru detector (Fig. 1) to pin 5 (plate) of 3CB6 (V3). Low side to chassis.	A1	Adjust to place marker in trap notch as in Fig. 2.
2.	"	"	"	41.25MC 45.75MC 47.25MC	"	"	A2, A3, A4	Adjust for response curve similar to Fig. 2. A2 and A3 control the shape of the top of the curve while A4 positions the 41.25MC marker. The adjustment of A4 must be correct or the sound rejection will not be correct. If the 45.75MC marker is not exactly on the peak the 44.5MC marker will be incorrectly positioned in later steps.
3.	"	"	"	42.8MC	"	Vert. amp. thru 47K to point (C). Low side to chassis.	A5	Increase bias at point (A) to -4.5 volts. Connect a VTVM (DC probe) to point (C). Common to chassis. Adjust sweep output to provide a reading of 2 volts DC on VTVM. Adjust A5 for maximum gain at 42.8MC.
4.	"	"	"	41.25MC	"	"	A6	Adjust for MINIMUM amplitude at 41.25MC.
5.	"	"	"	45.3MC	"	"	A7	Adjust for maximum gain at 45.3MC.
6.	"	"	"	44.0MC	"	"	A8	Adjust for maximum gain at 44.0MC.
7.	"	"	"	41.25MC 42.4MC 42.8MC 44.0MC 44.5MC 45.3MC 45.75MC 47.25MC	"	"		If necessary, retouch A5 thru A8 for response curve similar to Fig. 3. A8 adjusts symmetry of curve top. A7 controls the position of the 45.75MC marker and A5 controls position of the 42.4MC marker. DO NOT RETOUCH A2 OR A3. THESE MUST BE ADJUSTED AS IN STEP 2.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.01MFD	High side to pin 2 (grid) of 12BY7A video amp. (V6). Low side to chassis.	4.5MC (unmod)	Any non-interfering channel.	DC probe to pin 11 (cathode) of picture tube. Low side to chassis.	A9	Adjust for MINIMUM deflection.

This adjustment may also be made by observing a picture from a station and adjusting A9 for MINIMUM 4.5MC beat (grainy appearance) in picture.

SOUND IF ALIGNMENT

1. Tune in a TV station and reduce the signal strength at the antenna terminals by using an attenuator or similar device until a hiss is heard in the sound similar to super regeneration.
2. Adjust A10, A11, A12 and buzz control (R8) for maximum undistorted sound and MINIMUM buzz.
3. If the "hiss" disappears during step 2, reduce the signal farther until "hiss" returns.

RF AND MIXER ALIGNMENT

Connect the negative lead of 2.5 volts bias supply thru 10K to point (D). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. amp. thru 10K to point (B). Low side to chassis.	A13, A14, A15	Adjust for response curve similar to Fig. 4 with markers above 90%. A15 is adjusted by expanding or compressing coil turns. Adjust A15 for maximum amplitude between markers. If necessary, retouch A13 and A14 for symmetrical response.
10.	"	"	"	"	"	Vert. amp. thru detector (Fig. 1) to pin 5 (plate) of 3CB6 (V3). Low side to chassis.	A16	Adjust for MINIMUM amplitude of response curve.
11.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. thru 10K to point (B). Low side to chassis.		Adjust RF strip coil on each channel for maximum response on each channel. If necessary, make compromise adjustments of A13 and A14 for symmetrical response.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT

Connect the negative lead of a 4.5 volt bias supply to point (A). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. thru 47K to point (C). Low side to chassis.	A17	Adjust to place sound marker in trap notch as in Fig. 5. Video marker should fall at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A18	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A19	
			195MC (10MC Swp)	193.25MC 203.75MC	10		A20	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A21	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A22	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A23	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A24	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A25	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A26	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A27	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A28	
13.	If interference is noted on any channel, adjust A29 for MINIMUM interference (beat pattern) while observing picture.							

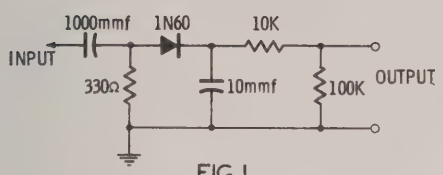


FIG.1

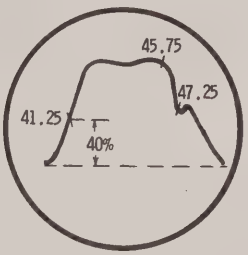


FIG.2

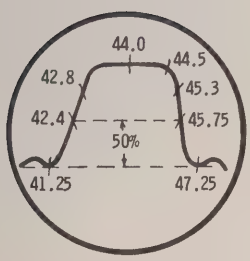


FIG.3

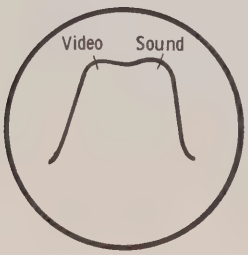


FIG.4

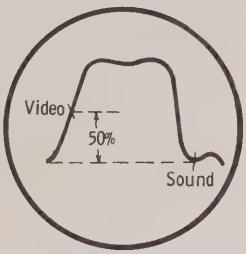
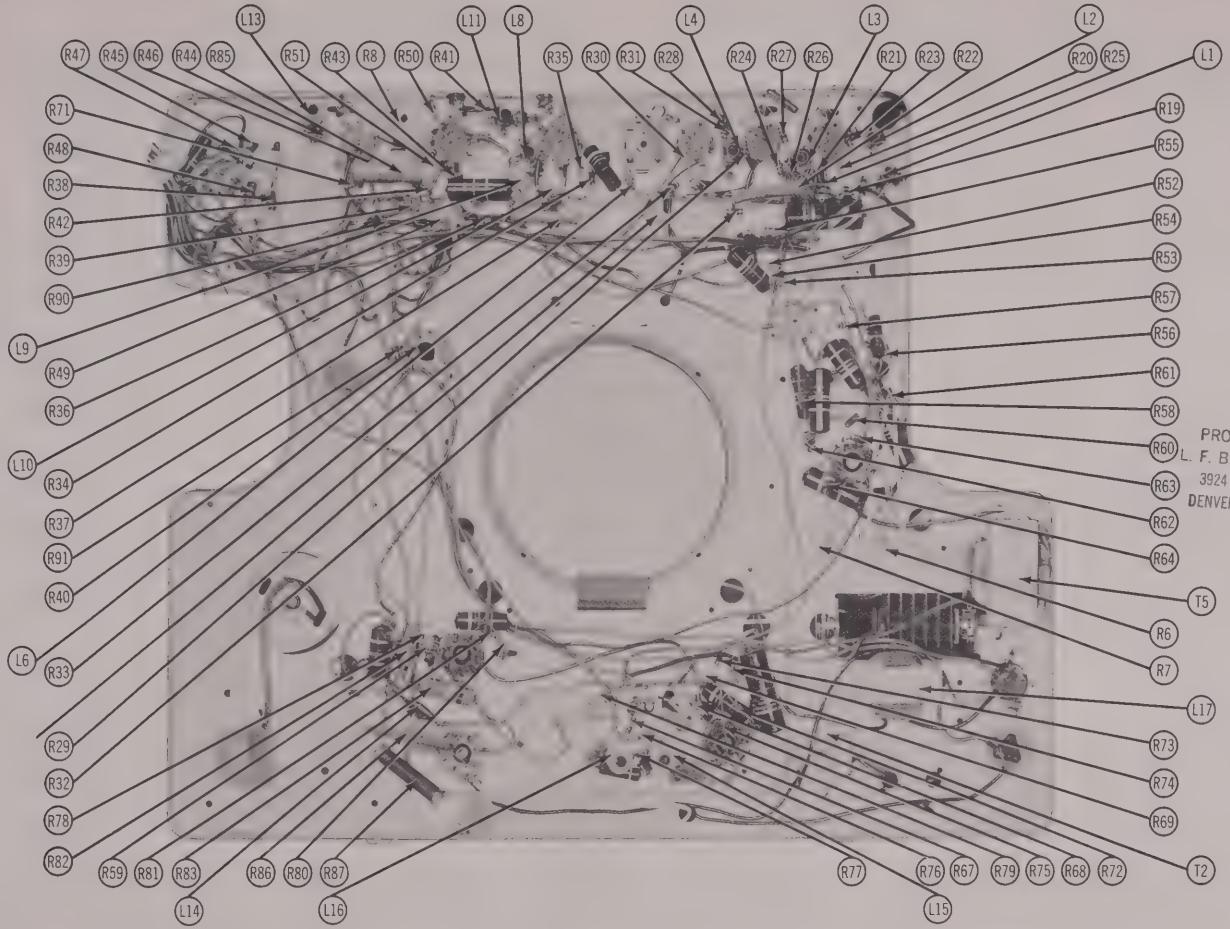


FIG.5



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

RESISTANCE MEASUREMENTS

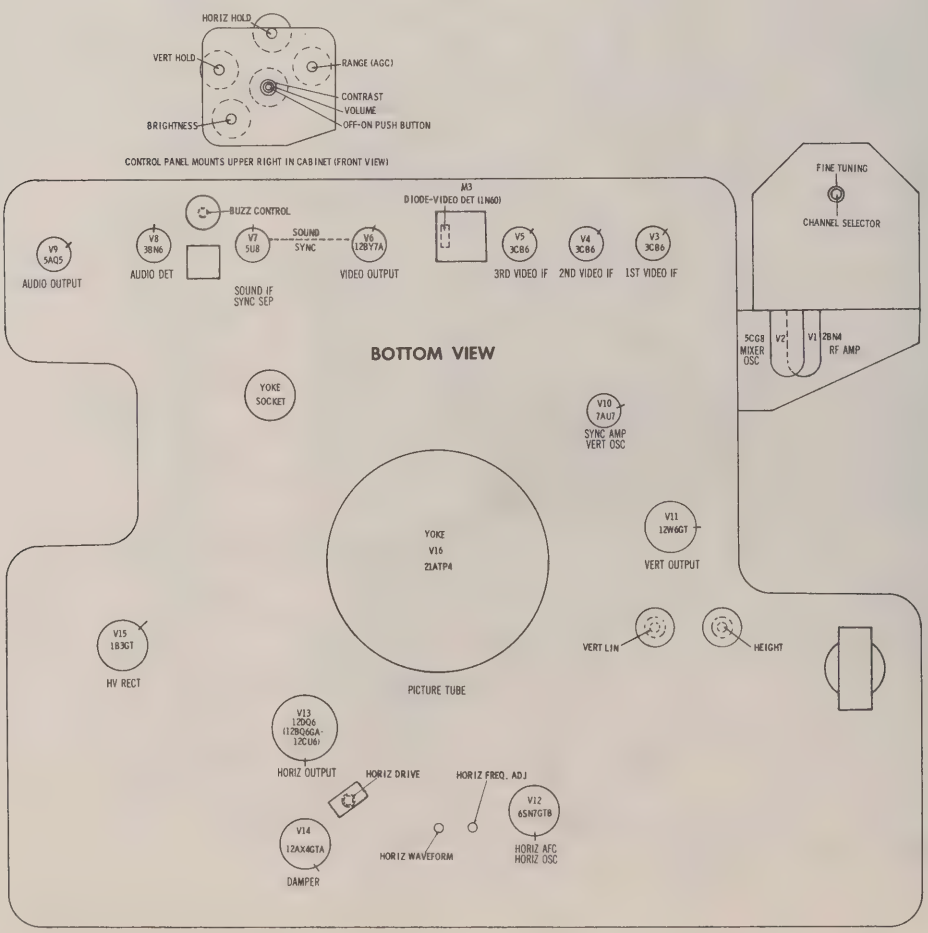
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	2BN4	0Ω	2Meg	1.5Ω	1Ω	† 2700Ω	0Ω	2Meg		
V2	5CG8	10K	† 8500Ω	0Ω	0Ω	1Ω	† 2700Ω	† 12K	0Ω	223K
V3	3CB6	800K	47Ω	5.5Ω	6.5Ω	† 5500Ω	† 5500Ω	0Ω		
V4	3CB6	800K	47Ω	6.5Ω	7.5Ω	† 5500Ω	† 5500Ω	0Ω		
V5	3CB6	.2Ω	180Ω	7.5Ω	8.5Ω	† 2200Ω	† 2200Ω	0Ω		
V6	12BY7A	• 55Ω	1Meg	0Ω	10.5Ω	10.5Ω	11.5Ω	† 3700Ω	† 1700Ω	0Ω
V7	5U8	† 820K	100K	† 150K	8.5Ω	9.5Ω	† 82K	0Ω	0Ω	2.2Meg
V8	3BN6	• 230Ω	3.2Ω	5Ω	5.5Ω	† 6500Ω	6Ω	† 330K		
V9	5AQ5	250K	330Ω	10.5Ω	9.5Ω	† 900Ω	† 500Ω	250K		
V10	7AU7	• ‡ 1.8Meg	• 1Meg	175Ω	11.5Ω	11.5Ω	† 13K	40K	0Ω	12.5Ω
V11	12W6GT	TP	15Ω	† 450Ω	† 450Ω	2.2Meg	TP	12.5Ω	• 1300Ω	
V12	6SN7GTB	400K	† 56K	0Ω	1.2Meg	† 35K	400K	3.5Ω	5Ω	
V13	12DQ6	NC	17Ω	TP	† 10K	470K	TP	15Ω	100Ω	TOP CAP ‡ 10Ω
V14	12AX4GTA	TP	NC	¶	NC	† 40Ω	NC	17Ω	20Ω	
V15	1B3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP ‡ 310Ω
V16	21ATP4	1.5Ω	• 24K	Pin 6 † 100K	Pin 10 ‡ 470K	Pin 11 • 270K	Pin 12 3.5Ω			

¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

† MEASURED FROM OUTPUT OF M2. NC NO CONNECTION

‡ MEASURED FROM PIN 3 OF V14. TP TIE POINT

• THIS READING WILL VARY, CONTROL SET FOR NORMAL OPERATION.



TUBE PLACEMENT CHART

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CHASSIS TOP VIEW

FIRESTONE MODEL 13-G-224
(Code 334-6-N661A)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	2BN4	
V2	Mixer-Oscillator	6J8	
V3	1st Video IF Amp	6J8	
V4	2nd Video IF Amp	6J8	
V5	3rd Video IF Amp	6J8	
V6	Video Output	12BY7 ▲	
V7	Sound Discrim. Sec.	6BN8	
V8	Audio Det.	6BN8	
V9	Audio Output	5 4Q5	
V10	Horiz. Amp.-Vert. Osc	12AU7	
V11	Vert. Output	12W6GT	
V12	Horiz. AFC-Horiz. Osc	6BN7GTB	
V13	Horiz. Output	2D2Q	Note 1
V14	Damper	12AX4GTA	
V15	HV Rectifier	1B3GT	

Note 1: Some versions may use 12BQ6GA, or 12CU6

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	FIRESTONE PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V16	21AP4	21AP4	21AFP4A/21AFP4B	21AP4/ 21AP4A] 21AP4B]	▲ Silver screen "GS" ▲ Aluminized

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	VOLT	REPLACEMENT DATA FIRESTONE PART No.	ARROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.	NOTES
C1	40	350	452431	AFH31-23	XA2351	TP1U7	TM5-34	T-005	TVL-1428	
C2	20	350	452431	AFH34-02	BQ2351 60	TP3U8 TC35		T-017 MT-0525	ET376 *	
C3A	20	350	452430	AFH3-99-81	DO346	TP430.76 TC68		T-US MT-0550	TVL-3574-8	
C3B	20	350			BR435					
C4	40	350	452431	5BR4-50	TC30	ML5-50	MT-0504	TE-1303		

* Non-catalog item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP	VOLT	REPLACEMENT DATA FIRESTONE PART No.	ARROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	20			BPD-00013	DD-121	L1F713	ED-120	UC-5313	5GA-T12	
C6	33									
C7	20									
C8	.2									
C9	.001			EF-001	MFT-1000				S03C-DI	
C10	.001			EF-001	MFT-1000				S03C-DI	
C11	47				S20-5		S32-B			N900
C12	3									
C13	4.5				S20-5		S32-B			
C14	4.5				S20-5		S33-B			
C15	4.5									
C16	4.5									
C17	.100			BPD-001	DD-103	BYA501	ED-1000	DC531	5HK-DI	
C18	6.5									
C19	6.5									
C20	.001			EF-001	MFT-1000				S03C-DI	
C21	.001			EF-001	MFT-1000				S03C-DI	
C22	.001			EF-001	MFT-1000				S03C-DI	
C23	47			SI 47	DS-470	LT6Q47	GP-47	UC-5447	5GA-Q47	
C24	47			SI 47	DS-470	LT6Q47	GP-47	UC-5447	5GA-Q47	
C25	680			BPD-00068	BYA107E6	ED-680	UC-5368	5GA-T68		
C26	56			NPO-SI 56	TCZ-56	C10QS6C	TCD-56			NPO
C27	68			BPD-00068	DD-681	BYA107E6	ED-680	UC -5368	5GA-T68	
C28	56			NPO-SI 56	TCZ-56	C10QS6C	TCD-56		5GA-T56	NPO
C29	680			BPD-00068	DD-681	BYA107E6	ED-680	UC-5368	5GA-T68	Note 1
C30	680			BPD-00047	DD-681	BYA107E7	ED-470	UC-5347	5GA-T47	
C31	680			BPD-00068	DD-681	BYA107E6	ED-680	UC-5368	5GA-T68	
C32	20	200		BPD-05	DF-503	CUB2E47		GEM-3147	3TM-S47	
C33	.04			BPD-001	DD-103	BYA501	ED-1000	DC531	5HK-DI	
C34	47			SI 47	DD-470	LT6Q47	GP-47	UC-5447	5GA-Q47	
C35	.02		47X5S0							N33
C37	.1	600		P4S8N-1	DF-104	CUB4P1		GEM-4041	4TM-P1	
C38	.047	300		BPD-05	DF-503	CUB2E47		GEM-3147	3TM-S47	
C39	.47	300		P2S8N-47		CUB2P47		GEM-3047	3TM-P47	
C40	1000			BPD-001	DD-102	BYA5D1	ED-1000	DC531	5HK-DI	
C41	1000			BPD-001	DD-102	BYA5D1	ED-1000	DC531	5HK-DI	
C42	1000			BPD-01	DD-108	BYA501	ED-01	DC531	5HK-SI	
C43	1.5			NPO-SI 1.5	TCZ-1R5	C10V15C	TCD-1.5	ZT-4515	5TCCB-V15	
C44	32									N470
C45	100									N1500
C46	1000			BPD-001	DD-103	BYA5D1	ED-1000	DC531	5HK-DI	
C47	1000			BPD-001	DD-103	BYA5D1	ED-1000	DC531	5HK-DI	
C48A	1000			BPD-32001	DDB-103	BYCSD01	EDB-001	DCD531	5HK-3DI	
B	1000									
C49	15									N220
C50	1000			BPD-001	DD-103	BYA5D1	ED-1000	DC531	5HK-DI	
C51	5000			BPD-005	DD-502	BYA5D5	ED-005	DC535	5HK-D5	
C52	.0047	800		BPD-0047	DS-472	CUB4D47	GP-4700	GEM-4247	4TM-D47	
C53	330		47X370	1464-00033		BRS733		MS-433		
C54	5000			BPD-005	DD-502	BYA5D5	ED-005	DC535	5HK-D5	
C55	.047	600		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C56	.01	600		BPD-01	DD-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C57	1	400		P4S8N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C58	.047	600		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C59	.033	300	RCP10M3323M	BPD-03	DF-303	CUB3S33	ED-03	GEM-3333	3TM-S33	
C60	.047	600		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C61	8		RCM20B180K	1464-00018		B2S5Q8		MS-418		
C62	82		RCM20B820K	1464-00082		B2S5Q82		MS-482		
C63	100			1464-0001		B2S571		MS-431		
C64	.047	600		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C65	.047	600		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C66	.033	300	RCP10M3323M	BPD-03	DF-303	CUB3S33	ED-03	GEM-3333	3TM-S33	
C67	.47	300		P2S8N-47		CUB2P47		GEM-3047	3TM-P47	
C68	.0082			1464-00082		B2S582		MS-482		
C69	.01	600		BPD-01	DD-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C70	680		RCM20B821K	1464-00082		B2S582		MS-482		
C71	70-700		17A371							
C72	1000		803D	BPD-001	DD-102	BYA5D1	ED-1000	DC531	5HK-DI	
C73	.047	400		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C74	56	5000	47X756		DD50-S80				7GA-Q56	
C75	.047	600		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	

CAPACITORS (cont)

ITEM No.	RATING CAP	VOLT	REPLACEMENT DATA FIRESTONE PART No.	ARROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C76	.0001	.000	47X6S	BPD-2X001	DD2-102	BYC5D01	ED2-001	DCD521	5HK-2DI	
C77A	1000									
B	1000									

Note 1: A 500MMF is used in some versions.

CONTROLS

ITEM No.	RATING RESIST ANCE	WATTS	REPLACEMENT DATA FIRESTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	.000Ω		78X25					Contrast
B	1Meg							Volume
R2A	500K		40X416	AB-59	A47-500K-S	QU-153	L-50	Brightness
B	Shaft			AK-8	RA-3-76	NQ	DE-37	
R3A	1.5Meg		40X415	AP-742	A47-1.5Meg-S	QU-338	U-55	Vert. Hold
B	Shaft			AK-8	RA-3-16	NQ	DE-37	
R4A	50K		40X414	AB-31	A47-50K-S	QU-123	L-35	Horiz. Hold
B	Shaft			AK-8	RA-3-10	NQ	DE-37	
R5	5 Meg		40X417					Range-Note 1
R6A	2.5Meg		40X398	BX-82	A47-2.5Meg-S	QU-259	9U-565	Height
B	Shaft			Not Req	RM-3	TQ	Not Req	
R7A	5Meg		40X399	AB-6	A47-1500-S	QU-109	TAP12L	Vert. Lin.
B	Shaft			AK-10	RM-3	TQ	Not Req	
R8	500Ω	2	40X397		39 500		FL-500	Buzz
R9	4ω & 16Ω	2	38X395					Volume-wire wound-Note 2
R10A	500K		40X422	B-59	A47-500K-S	QU-153	U50	Brightness
B	Shaft			Not Req	FS-3	Nut Req	Not Req	

Note 1: Value may vary from 7 to 10 megs.
Note 2 Consists of 4Ω element and a 10Ω element with a common rider

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	WATT	REPLACEMENT DATA FIRESTONE PART No.	IRC PART No.	NOTES
R11	470Ω			BTS-4700	
R12	1000Ω			BTS-1000	
R13	33000			BTS-3300	
R14	230Ω			BTS-230K	
R15	1000Ω			BTS-1000	
R16	6800Ω			BTS-6800	
R17	10K			BTS-10K	
R18	100K			BTS-100K	
R19	2.2Meg				
R20	5600Ω			BTS-5600	
R21	470Ω				
R22	5000Ω	4	43X333	PW4-5000	
R23	47Ω 5%		B3S470	BTS-47 5%	
R24	56K				
R25	1000Ω				
R26	470Ω			BTS-470	
R27	47Ω 5%		B3S470	BTS-47 5%	
R28	33K				
R29	47K			BTS-470	
R30	470Ω			BTS-180	
R31	180Ω				
R32	3Meg			BTS-3900	
R33	3900Ω			BTS-1Meg	
R34	1Meg			BTS-470	
R35	470		B6447O	BTS-33K	
R36	33K		43X331	BTS-100K	
R37	100Ω	4		BTS-180K	
R38	100K			BTS-1 5Meg	
R39	180K			BTS-100K	
R40	1.5Meg			BTS-68K	
R41	100K			BTS-680	
R42	68K			BTS-56K	
R43	68K			BTS-680	
R44	5600			BTS-10K	
R45	330K			BTS-330K	
R46	47000			BTS-4700	
R47	4700	1		BTA-470	
R48	330Ω	1		BTA-330	
R49	150K			BTS-150K	
R50	2.2Meg			BTS-2 2Meg	
R51	620K			BTS-620K	

ITEM No.	RATING OHMS	WATT	REPLACEMENT DATA FIRESTONE PART No.	IRC PART No.	NOTES
R52	680K			BTS-680K	
R53	47K			BTS-47K	
R54	68000Ω			BTS-6800	
R55	4700Ω			BTS-4700	
R56	680K			BTS-680K	
R57	470K			BTS-470K	
R58	33K			33K	
R59	470K			BTS-470K	
R60	8200Ω			BTS-8200	
R61	1MΩ			BTS-15K	
R63	2.2Meg			BTS-2.2Meg	
R63	100Ω			BTS-100	
R64	680Ω	1		BTA-680	
R65	560Ω				
R66	560Ω				
R67	220K				
R68	330K				
R69	820K			BTS-820K	
R70	120K				
R71	47K				
R72	33K				
R73	220K				
R74	3900Ω				
R75	82K				
R76	22K				
R77	10K			BTS-10K	
R78	15Meg			BTS-15Meg	
R79	56K			BTS-56K	
R80	68Ω		B85680	BTS-68	
R81	470K			BTS-470K	
R82	10K	2		BTS-10K	
R83	100Ω	2		BTS-100	
R84	5600Ω			BTS-5600	
R85	1700Ω	10	43X394		
R86	25Ω	10	43X390	FW10-25	
R87		30	43X239		Note 1
R88	6.5Ω		43X293		
R89	68K			BTS-68K	
R90	68K			BTS-68K	
R91	1.5Meg			BTS-1.5Meg	
R92	1500	2		BTS-150	

Note 1. A temperature compensating resistor: 20Ω Cold.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	FIRESTONE PART No.	REPLACEMENT DATA
K1	Ant. Input	470MMF, .2-1Meg	76X11	
K2	Ant. Input	470MMF, .2-1Meg	76X11	
K3	Chassis Isolation	470MMF, .2-1Meg	76X11	
K4	Vert. Integrator	3000MMF, 5000MMF, 9000MMF, 22K, 8200Ω, 8200Ω	76X7	Arrovox PA110 Centralab PC-100 Cornell-Dubilier UST-M2 Erie 1405-01 Sprague V-1

TRANSFORMER (MISC)

ITEM No.	RATING ↓ PRI.	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC	24V			53X361	P-5927 ①	P-3962 ①	P-8469 ①	21F98 ①	F-49X ①
T2	117VAC & .55A	& 2A	& 3V		54X18	P-5811 ② ③	P-3944 ② ③	P-8134 ② ③	21F08 ② ③	F-13X ②
	& .9A	& 2A								

① Measurements taken under load conditions.
② Drill one new mounting hole.
③ Tape center tap on secondary winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T3	Vert. Osc Trans.	94X10	58702	A 3003	30S71]	V410	A 8125	28A03	A 97X
T4	Horiz Output Trans.	53X359A	FB419] *4	NVO-30 ①	2S571] *8	X094] *3	HO-283 *	FLY 16]	D-80]
		53X359 ②	FB419] *4	NVO 30]	2S571] *9	X094] *4	HO-283 *	FLY 16]	D-50]
T5	Vert Output Trans.	51X173A	Z900 3 ④	A 2823] ④		V302] ④	A-8148 ⑤	28S72] ④	A 108X]
		51X5 73 ②	Z900 3 ④	A 2823] ④		V302] ④	A-8148 ⑤	28S72] ④	A-108X]
T6A	Yoke (90°) Horiz (24MH)	9A2387-1C ⑥	DF607 ⑥	MDF-92 ⑥	23SD1 ⑥	T90F19/43 ⑥	DY-16A ⑥	Y-6 ⑥	Y-41-1 ⑥
	Vert (40MH)	9A2387 ② 2A435 ⑦	DF607 ⑥	MDF-92 ⑥	23SD1 ⑥	T90F19/43 ⑥	DY-16A ⑥	Y-16 ⑥	Y-41-1 ⑥ YC-1 ⑦

① Drill new mounting hole(s)
Alternate part number.
Use 8 to 1 turns ratio.
Connect as auto transformer.
Cut and tape green lead.
Includes resistors R65 and R66
Yoke rear cover and centering device.
Use original rear cover and centering device
Use original horizontal damping network.
This part may be superseded by Parts Manufacturer's introduction of special unit for this application.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	8	9	9	9	9	8	9	9
	3	7 or 5	7 or 5	7 or 5	7 or 5	3	7 or 5	7 or 5
	2	NC See Note 8	NC See Note 8	NC See Note 8	NC See Note 8	2	NC See Note 8	NC See Note 8
	1	1	1	1	1	1	1	1
Special Notes ⇒		9	9	9	9	9	9	9

⑨ Install new damping network consisting of approx. 100MMF ② 2KV and 1000Ω ① 1 Watt connected in series across terminals #3 and #7 of horizontal yoke.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI	SEC	REPLACEMENT DATA FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T7	620Ω	6-8Ω	51X180	Z900 ① ②	A-2900 ① ②	A-3337 ①	24S60 ① ②	S-51X ① ②	① Drill one new mounting hole. ② Tape center tap on primary winding.

SPEAKER

ITEM No.	TYPE SIZE	FIELD	V C	IMP	REPLACEMENT DATA FIRESTONE PART No.	QUAM PART No.	NOTES
SP1	9"	PM	8-SI		12A538		

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	98MC Trap	9A2369		TV-152	6325	-
L2	1st. Video IF	9A2365		TV-131	6325	-
L3	2nd. Video IF	9A2363			6322	Includes 47.25MC trap
L4	3rd. Video IF	9A2364			6321	Includes 41.25MC trap
L5	4th. Video IF	9A2370				Includes cape., 30 microhenries coil & 3Ω
L6	Tweet Choke	9A2375		TV-180	6178	30 Microhenries
L7	Shunt Peaking Coil	39A12		19-4150	6120 *	180 Microhenries, wound on 2Ω
L8	4.5MC Trap	9A2366		30-1004	TV-151	1469
L9	Series Peaking Coil	39A38		19-4400 ▲	TV-190 ▲	6233 ▲ 250 Microhenries, wound on 6800Ω resistor
L10	Shunt Peaking Coil	39A33		19-3350 ▲	TV-195 ▲	6151 ▲ 225 Microhenries, wound on 2200Ω resistor
L11	1st. Sound IF	9A2366		30-1004	TV-151	1469
L12	2nd. Sound IF	9A2366		17-3495	TV-115	6303
L13	Quadrature Coil	9A2367		30-1005		1480
L14	RF Choke	9A2380		19-1501		4004 1.5 Microhenries

* Parallel with 33K resistor.
▲ Parallel with 68000 resistor
▲ Parallel with 2200Ω resistor

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES PRI.	SEC.	REPLACEMENT DATA FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	NOTES
L15	85Ω *		9A2371		TV-185	6211 ①				13-63 millihenries-Horiz. Freq. 7 5-35 5 millihenries Horiz. Waveform
L16	62Ω		9A2372							

* Tapped @ 60Ω.
① Enlarge mounting hole.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE @ CURRENT 1000 ^\	REPLACEMENT DATA FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L17	40Ω		.7 HY	52X95-2	C9037 ①	C-2996 ①	C-2538 ①	26C44 ①	C-17X ①

① Drill one new mounting hole.

FIRESTONE MODEL 13-G-224 (Code 334-6-N661A)

PARTS LIST AND DESCRIPTIONS (Continued)

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA						
	CURRENT (Measured)	FIRESTONE PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.
M1	.265A	66X16 ①	1090A ①	1N1007 ②	RS300SL ①	6S300A ①	6Q4 ①	300 ①
M2	.265A	66X16 ①	1090A ①	1N1007 ②	RS300SL ①	6S300A ①	6Q4 ①	300 ①

① Selenium type. ② Germanium type.

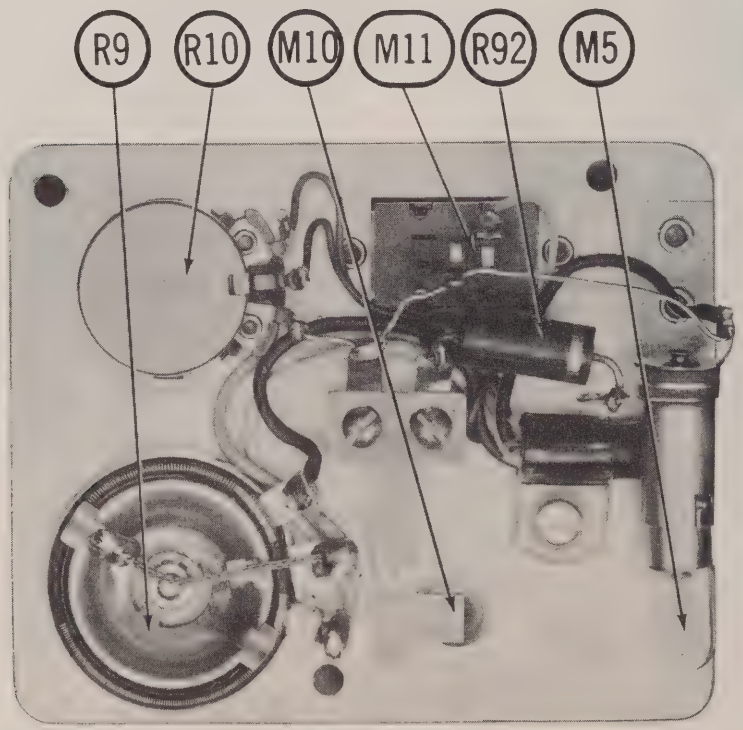
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		FIRESTONE PART No.	SYLVANIA PART No.	
M3	1N60 *		1N60	Video Detector (Pigtail)

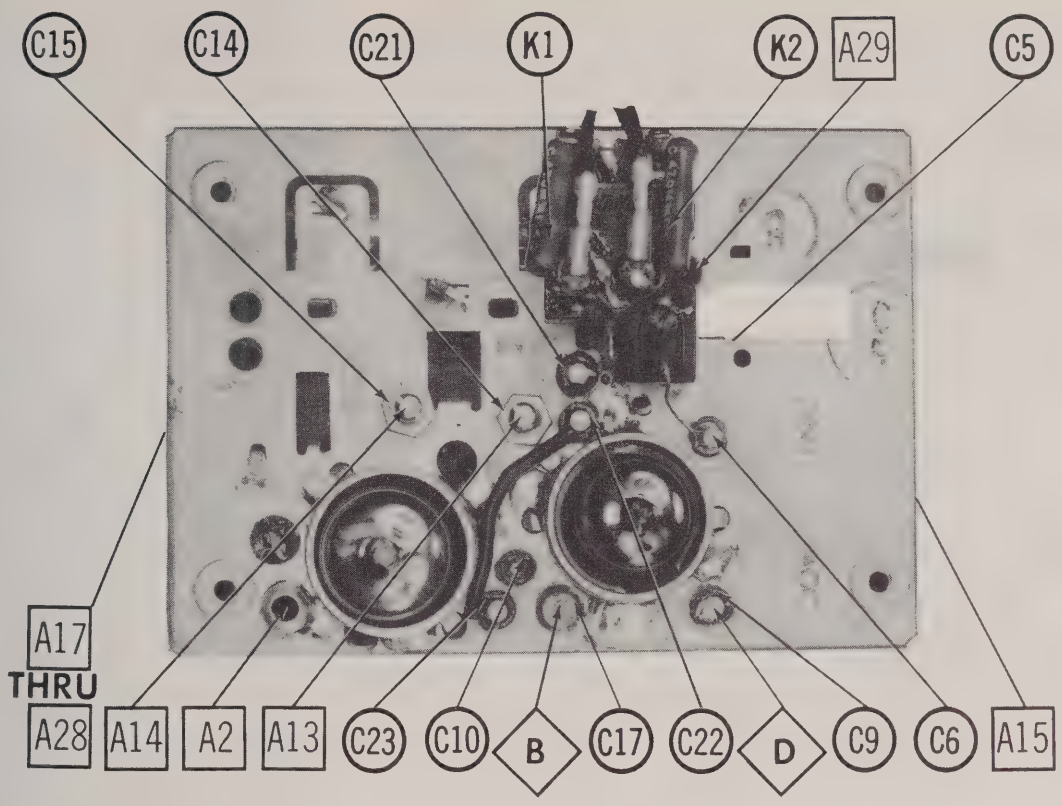
* A CK706 may be used in some versions.

MISCELLANEOUS

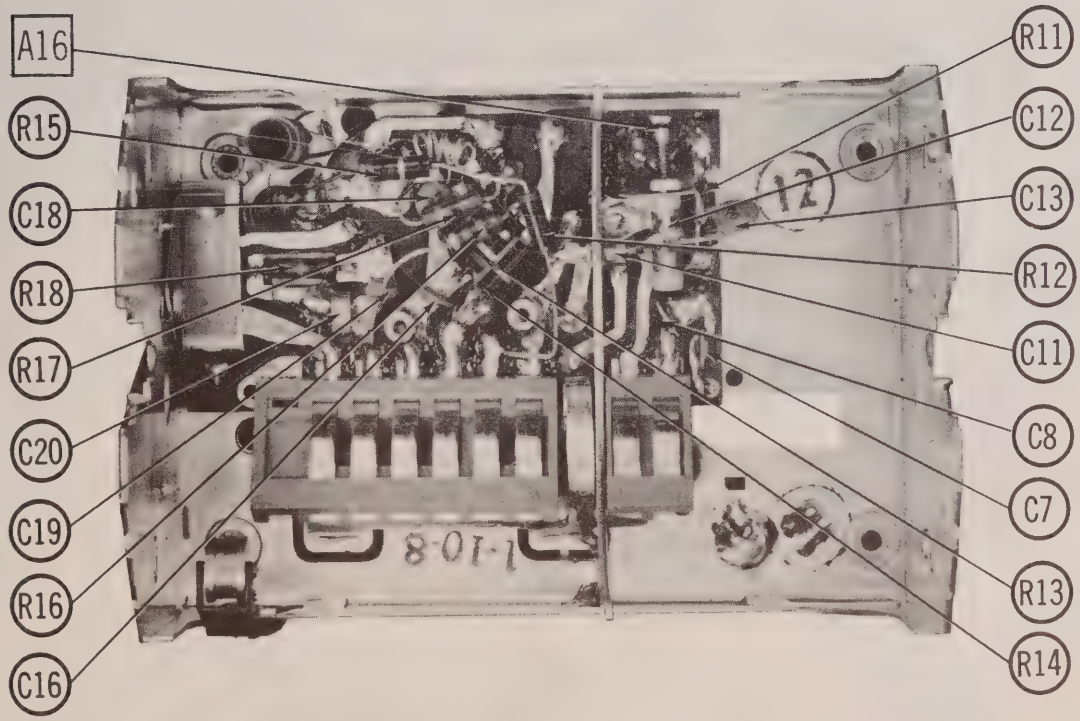
ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M4	Dial Light	S-38A221	#15 Type
M5	Dial Light		#313 Type, Remote control
M6	Tuner	25A1151	
M7	Switch	2A464	On-off, push type
M8	Switch	2A472	Sensing, contact type
M9	Switch	2A467	Remote/Manual, wafer type and rotary type
M10	Switch	2A469	Channel Selector, Contact type (Remote control head)
M11	Switch	2A466	On-off, slide Type, SPST (Remote control head)
M12	Relay	2A470	Remote, control
M13	Circuit Breaker	2A461	
M14	Centering Device	2A435	Includes yoke rear cover
M15	Ion Trap	2A421	
M16	Motor	22A223	Power tuning
M17	Switch		Pre-set Board (Rotary wafer)
	Yoke Clamp	30X611	
	Safety Glass	17X193-1	
	Mask	S-38A220	
	Knobs	10A861-2	Secondary controls
	Knob	10A870-11	Channel selector, mahogany
	Knob	10A871-1	Fine tuning, mahogany
	Knob	10A872-1	Volume, mahogany
	Knob	10A873-1	Contrast, mahogany
	Knob	10A870-12	Channel selector, oak
	Knob	10A871-2	Fine tuning, oak
	Knob	10A872-2	Volume, oak
	Knob	10A873-2	Contrast, oak
	Knob	10A883	Remote - local
	Knob	10A885	Brightness, volume
	Pushbutton	10A884	
	Bottom Cover	34X596	Remote control
	Case	34X595-2	Remote control
	Cable Assy.	S-38A235	



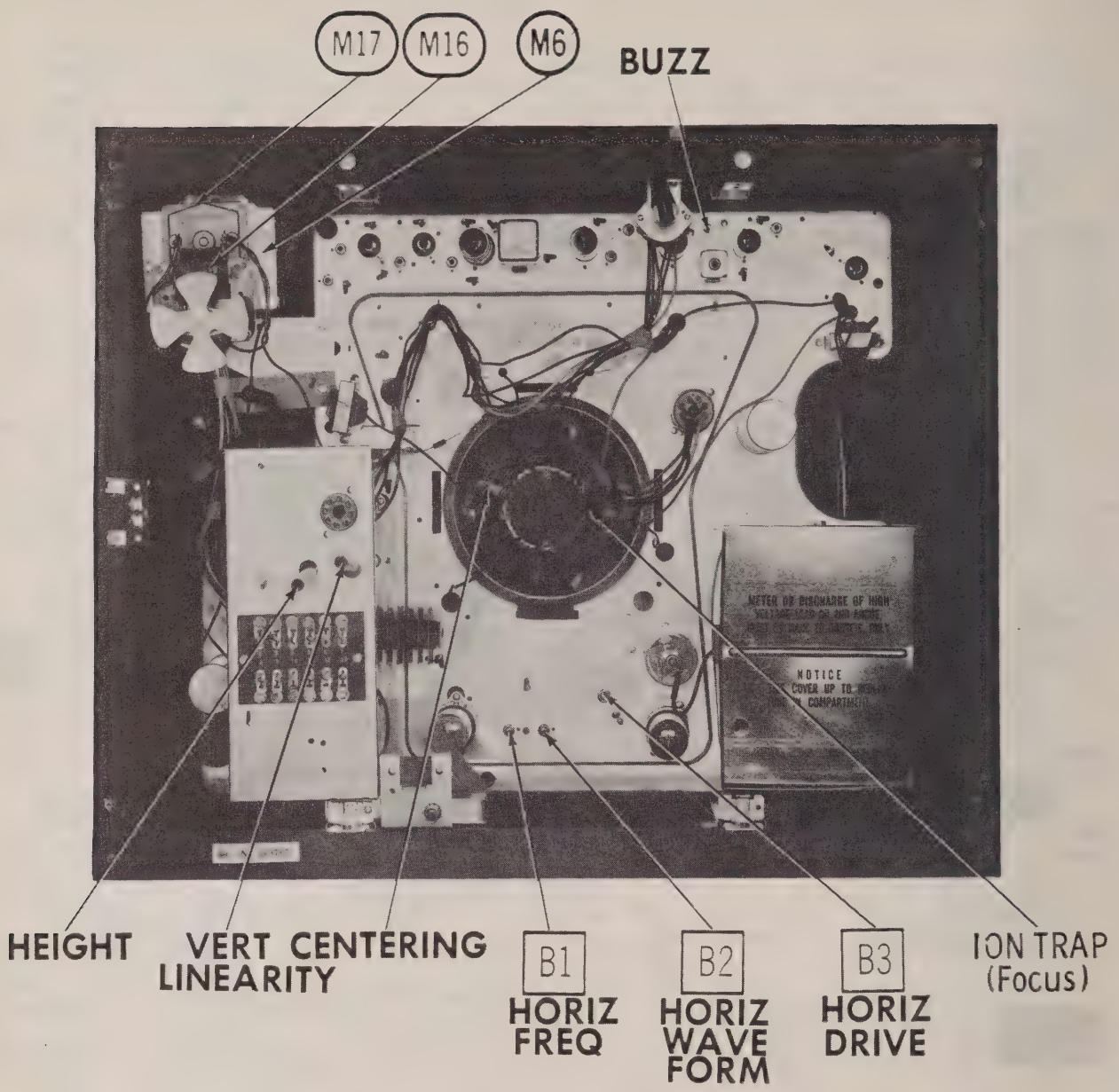
REMOTE CONTROL CHASSIS



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Turn the set on and tune in a TV station, preferably with a test pattern.
2. Turn the horizontal hold control fully clockwise and adjust the horizontal frequency slug (B1) until the picture is just about to tear out of sync (noticeable at the top of the picture). Turn the hold control to the center of its range.
3. Connect the vertical amplifier of the scope to point Ⓔ and low side to chassis. Adjust the horizontal waveform slug (B2) for equal amplitudes of the round and sharp peak as in Fig. 6. Keep the picture in sync with B1 while adjusting B2.
4. Turn the contrast control fully counter clockwise and the brightness control up so the picture appears washed out. Turn the horizontal drive trimmer (B3) clockwise until white vertical bars appear in the left center portion of the raster, then turn B3 counter clockwise until the white bars just disappear.

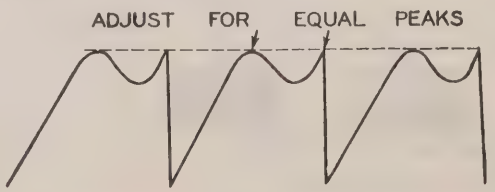


FIG. 6

PHOTOFACT* Folder
*TRADE MARK

HALLICRAFTERS MODELS 14TS780B, M, T, 14TS781B, M, T (Ch. A2010, B2010)

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MODEL 14TS780M (Ch. A2010)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TRADE NAME	Hallicrafters	MODELS	CHASSIS
		14TS780B, M, T	A2010
		14TS781B, M, T	B2010
MANUFACTURER	The Hallicrafters Co., 4401 W. 5th. Ave., Chicago 4, Ill.		
TYPE SET	Television Receiver		
TUBES	Thirteen		
POWER SUPPLY	110-120 Volts AC - 60 Cycles	RATING - 115 Watts, 1.14 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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Disassembly Instructions 1
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Chassis-Top View 7
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Tube Failure Check Chart 3
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HALLICRAFTERS MODELS 14TS780B, M, T, 14TS781B, M, T (Ch. A2010, B2010)

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PHOTOFACT* Folder
*TRADE MARK

HALLICRAFTERS MODELS 14TS780B, M, T, 14TS781B, M, T (Ch. A2010, B2010)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs.
2. Remove 6 metal screws, 2 antenna leads and rear cover.
3. Remove picture tube socket, Ion trap, HV lead and 2 speaker leads.
4. Remove 2 metal screws holding speaker and remove speaker.
5. Remove 2 metal screws holding AC interlock bracket.
6. Remove 2 chassis bolts from bottom.
7. Remove 1 top chassis bolt (middle one in handle).
8. Remove chassis.

MODEL 14TS780M (Ch. A2010)

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS

Care should be exercised when connecting test equipment or physcially contacting chassis.

MODELS	CHASSIS
14TS780B, M, T	A2010
14TS781B, M, T	B2010

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SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs. The HIGH band adjustments may be made with the slug located near the right side, the LOW band by slug near the bottom of the tuner. Adjust from highest to lowest channel.

PICTURE TUBE SAFETY GLASS CLEANING

1. Remove the front handle mounting screw.
2. Remove 2 metal screws on the bottom, holding the front.
3. Remove the front of the cabinet.
4. Remove the clamps holding the safety glass and remove the glass.

FOCUS

Focus may be varied by placement of a strap on the picture tube base between pins 6 and 2 or 6 and 10. Readjust Ion trap for best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

To adjust the horizontal oscillator, remove the rear cover and supply power to the set. Set the horizontal hold control at mid-position and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

FUSES

A 4.7Ω fusible resistor (R68) is used for LV power supply protection.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

HALLICRAFTERS MODELS 14TS780B, M, T, 14TS781B, M, T (Ch. A2010, B2010)

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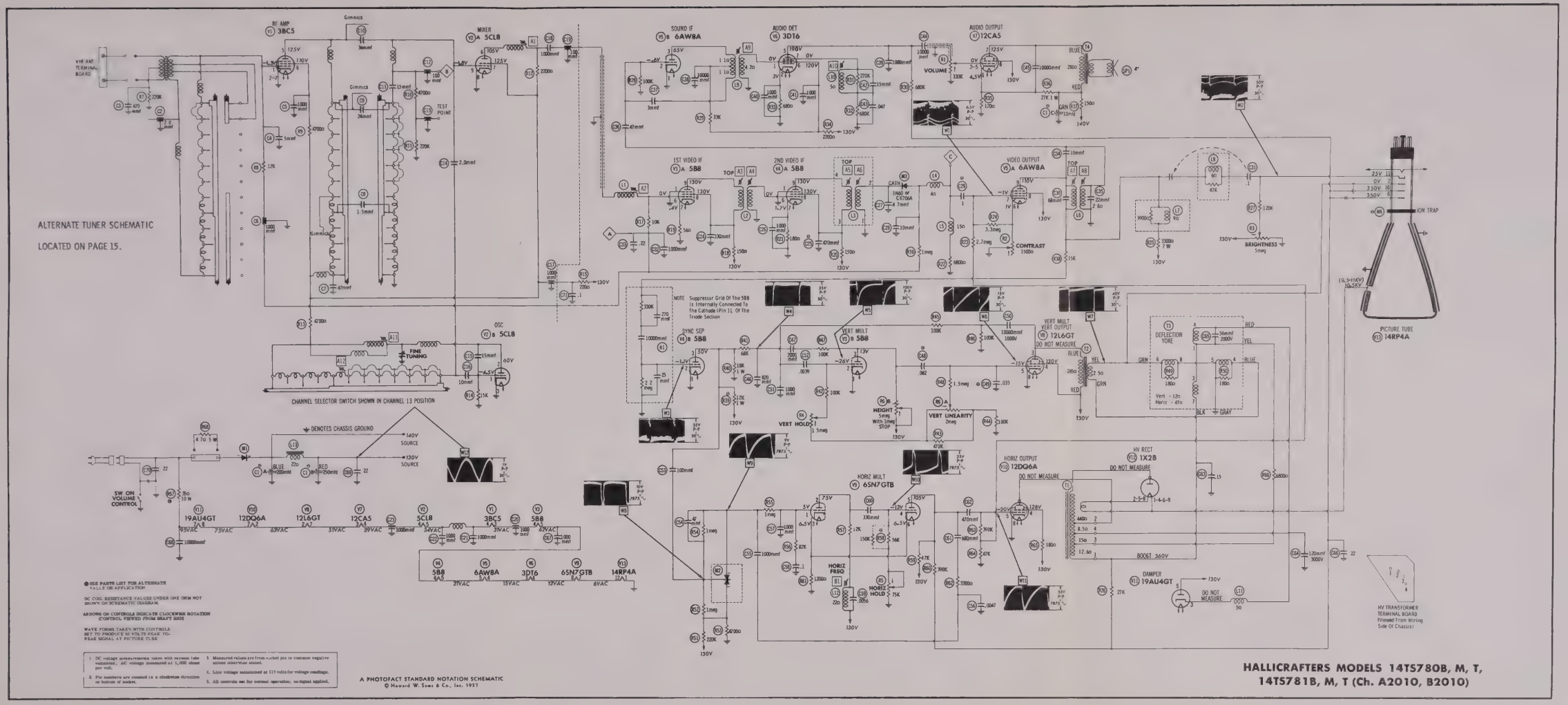
ALTERNATE TUNER SCHEMATIC
LOCATED ON PAGE 15.
RF AMP V1 3BC5
MIXER V3 A 5CL8
OSC V2 B 5CL8
SOUND IF V5 B 6AW8A
AUDIO DET V6 3DT6
AUDIO OUTPUT V7 12CA5
1ST VIDEO IF V3 A 5B8
2ND VIDEO IF V4 A 5B8
VIDEO OUTPUT V5 A 6AW8A
SYNC SEP V4 B 5B8
VERT MULT V3 B 5B8
VERT MULT VERT OUTPUT V8 12L6GT
HORIZ OUTPUT V10 12DQ6A
HORIZ MULT V9 6SN7GTB
HV RECT V12 1X2B
DAMPER V11 19AU4GT
PICTURE TUBE V13 14RP4A
ION TRAP
VOLUME
CONTRAST 150Ω
BRIGHTNESS 5meg
HEIGHT 5meg With Lineal STOP
VERT LINEARITY 2meg
VERT HOLD
HORIZ FREQ
HORIZ HOLD 75K
FINE TUNING
TEST POINT
DEFLECTION YOKE
BOOST 360V
DO NOT MEASURE
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
DENOTES CHASSIS GROUND
140V SOURCE
130V SOURCE
SW ON VOLUME CONTROL
19AU4GT 12DQ6A 12L6GT 12CA5 5CL8 3BC5 5B8
5B8 6AW8A 3DT6 6SN7GTB 14RP4A
NOTE Suppressor Grid Of The 5B8 Is Internally Connected To The Cathode (Pin 1) Of The Triode Section
HV TRANSFORMER TERMINAL BOARD (Viewed From Wiring Side Of Chassis)

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 30 VOLTS PEAK TO-PEAK SIGNAL AT PICTURE TUBE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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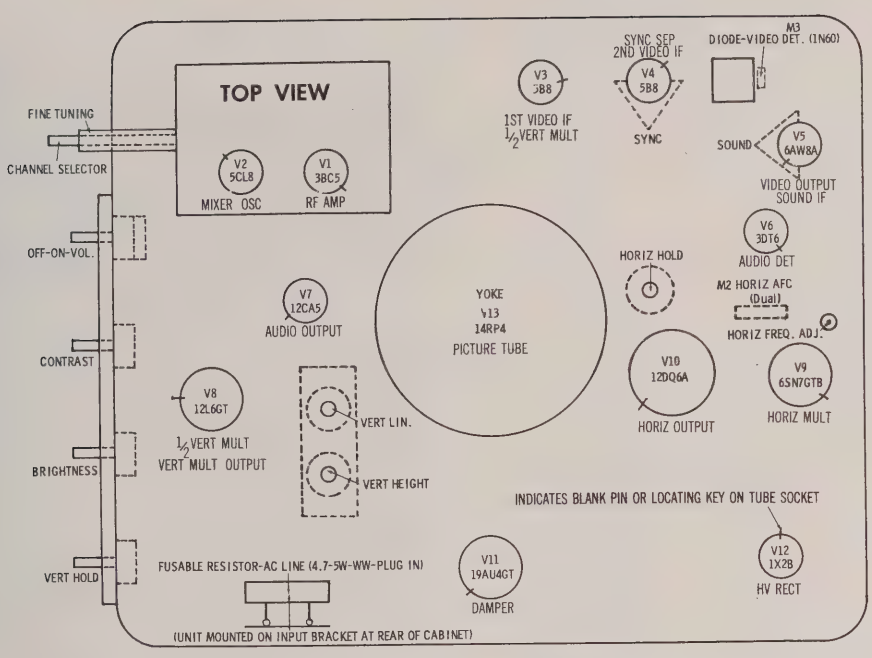
HALLICRAFTERS MODELS 14TS780B, M, T, 14TS781B, M, T (Ch. A2010, B2010)

TUBE PLACEMENT CHART



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TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

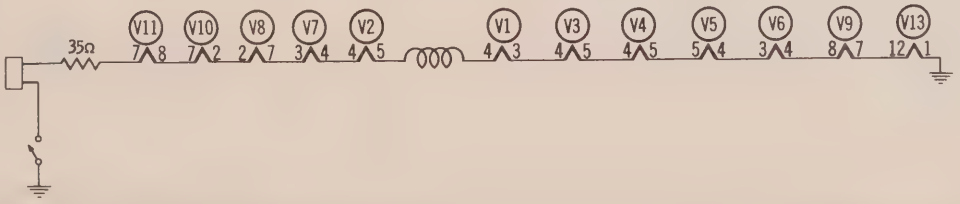
POWER SUPPLY FAILURE
No raster, no sound - **Fusible Resistor (R68), Rectifier (M1)**

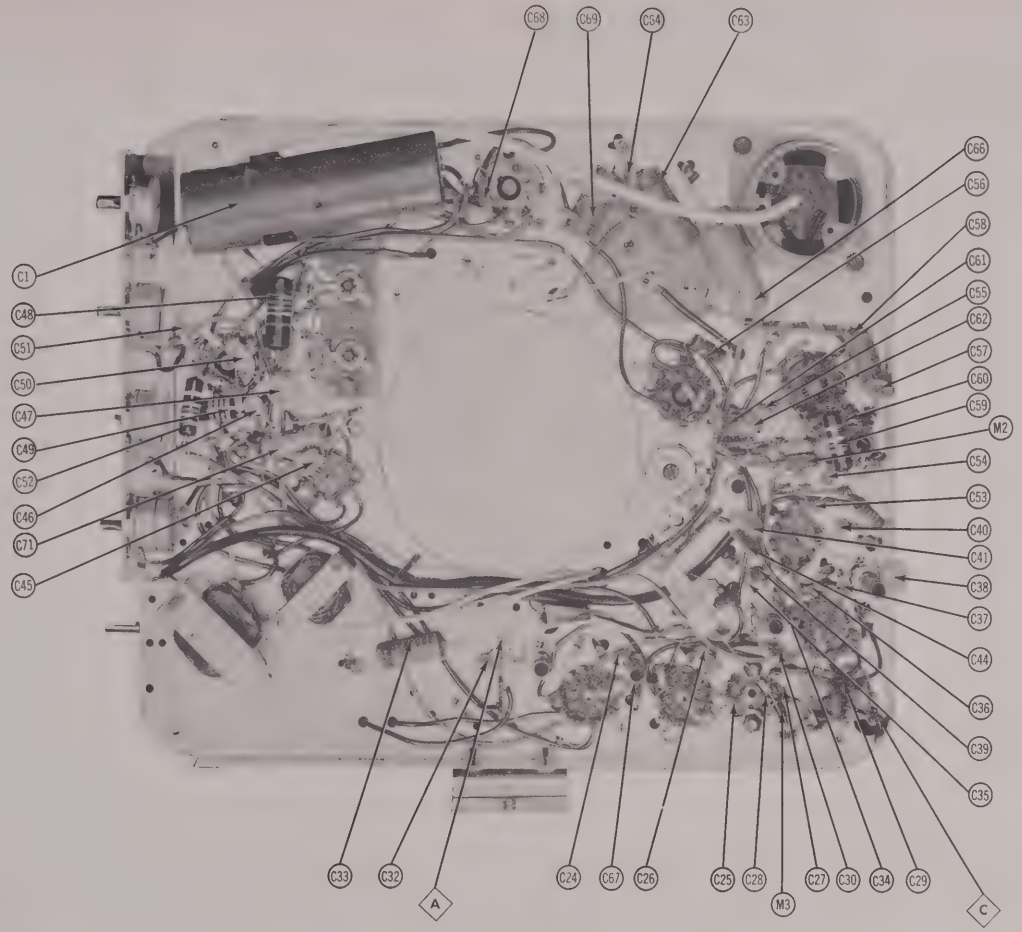
LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, Diode (M3), V5**
No pic, no sound, has snow - **V1, V2**
No pic, has sound, has raster - **V5, V13**
Has pic, no sound - **V5, V6, V7**

SYNC FAILURE
No vert. sync - **V3, V4, V8**
No horiz. sync - **V4, Diode (M2), V9**
No vert. or horiz. sync - **V4**

SWEEP FAILURE
No raster, has sound - **M2, V9, V10, V11, V12, V13**
No vertical deflection - **V3, V8**
Poor vert. linearity or foldover - **V3, V8**
Poor horiz. linearity or foldover - **V9, V10, V11**
Narrow picture - **V9, V10, V11, M1**
Vert. off freq. - **V3, V4, V8**
Horiz. off freq. - **V4, M2, V9**

Since this receiver employs tubes used in a series filament network, an open filament in any tube in the series will cause the set to be inoperative. (See circuit below.)





CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped and kept away from the chassis.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias battery to point Ⓐ. Positive to chassis.
Disable oscillator by replacing Mixer-Osc. tube 5CL8 (V2) with a 5CL8 with pin 1 removed.
Short the antenna terminals.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	1000MMF ceramic capacitor	High side to point Ⓑ. Low side to chassis.	44.0MC (10MC Swp)	42.75MC 45.75MC	Any channel.	Vert. amp. thru detector (Fig. 1) to plate, pin 9 of 5B8 (V3). Low side to chassis.	A1, A2	Adjust for response similar to Fig. 2 with markers in proper positions.
2.	"	High side to pin 6 (grid) of 5B8 (V3). Low side to chassis.	"	"	"	Vert. amp. thru detector (Fig. 1) to plate, pin 9 of 5B8 (V4). Low side to chassis.	A3, A4	"
3.	"	High side to pin 6 (grid) of 5B8 (V4). Low side to chassis.	"	"	"	Vert. amp. to point Ⓒ. Low side to chassis.	A5, A6	"
4.	"	High side to point B. Low side to chassis.	"	"	"	"		Retouch A1 thru A6 as needed to correct for curve similar to Fig. 3. Remove bias and replace 5CL8 (V2).

SOUND IF ALIGNMENT

Set the contrast control fully clockwise. Set volume control at midrange.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	1000MMF ceramic capacitor	High side to point Ⓒ. Low side to chassis.	Not used.	4.5MC (400∿ 30% AM Mod)	Any non-interfering channel.	Vert. amp. thru detector (Fig. 4) to pin 11 (cathode) of picture tube. Low side to chassis.	A7, A8	Turn A7 fully counter clockwise. Turn A8 fully clockwise. Turn A7 clockwise for MINIMUM 400∿ indication on scope.
6.	"	"	4.5MC (15KC Swp)	Not used.	"	Across secondary of output transformer.	A8, A9, A10	Use only enough sweep generator output to provide usable pattern on scope. Turn A10 fully counter clockwise. Adjust A8, A9 and A10 for maximum indication on scope. Remove test equipment and tune in a TV station. Retouch A10 for MINIMUM buzz.

OSCILLATOR ALIGNMENT

Turn the set on and tune in the highest high band channel (7-13) operating in the area and adjust A11 for clearest picture and best sound. A11 is located below and to the right of the tuning shaft. Switch the channel selector to the highest low band channel (2-6) operating in the area and adjust A12 for clearest sound and best picture. A12 is located directly to the left of the tuner shaft.

RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

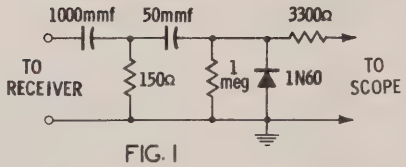


FIG. 1

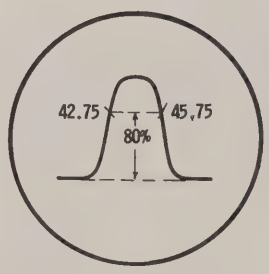


FIG. 2

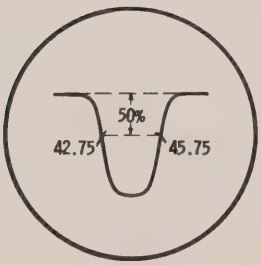


FIG. 3

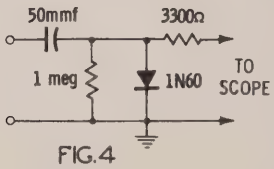
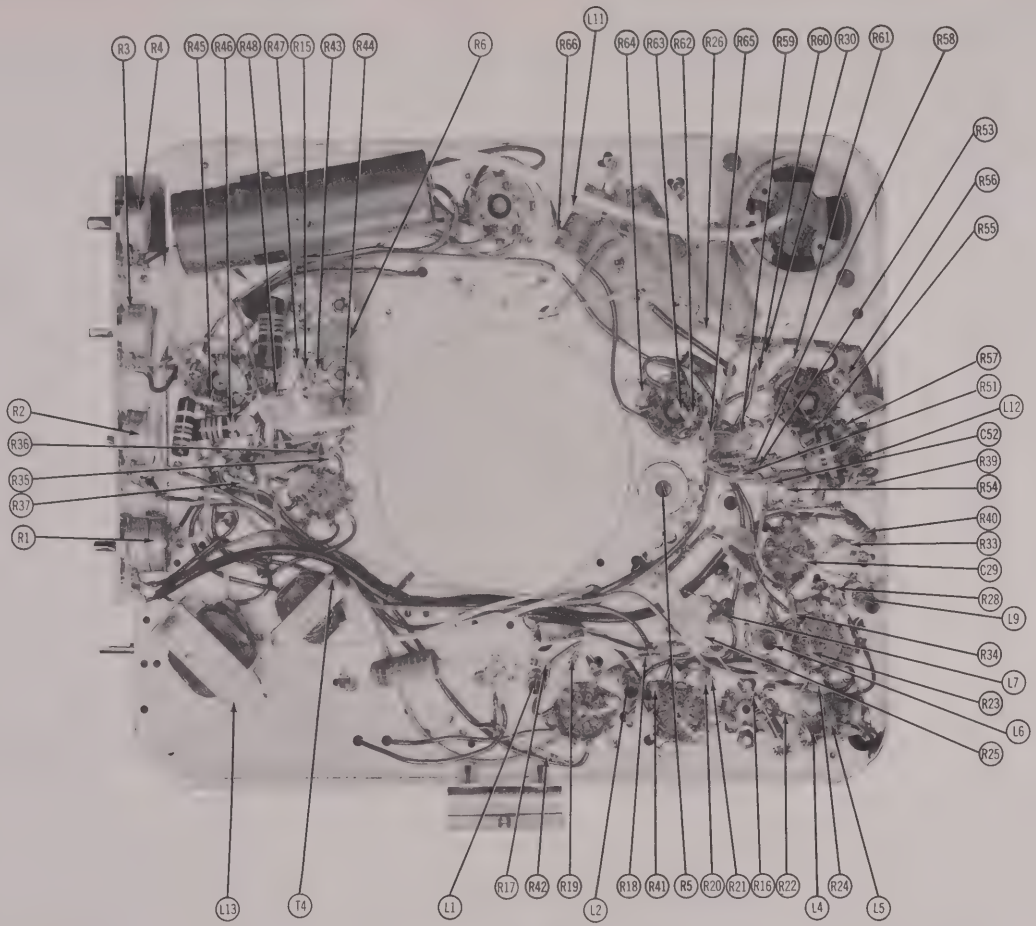


FIG. 4

CHASSIS TOP VIEW



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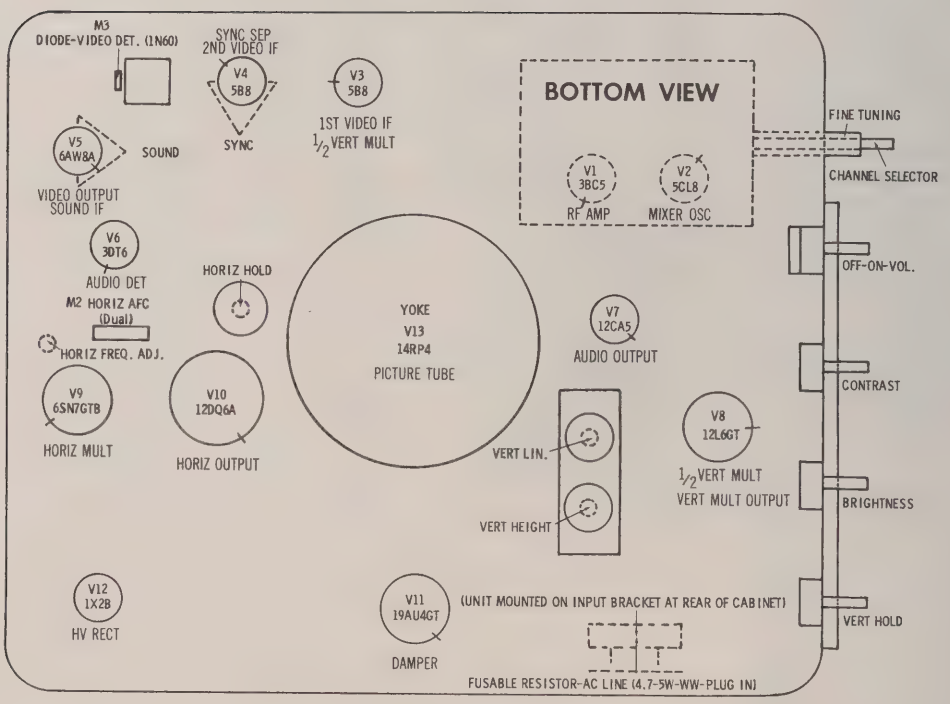
CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

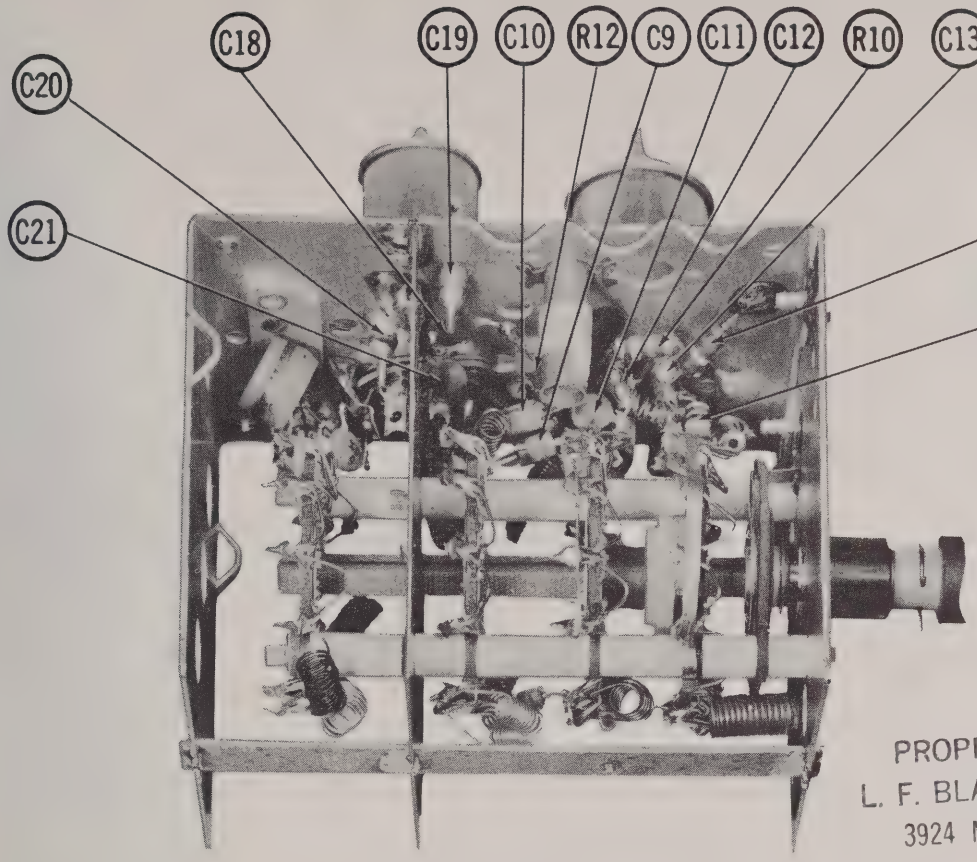
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BC5	1Meg	0Ω	6.5Ω	7Ω	†240Ω	†5000Ω	0Ω		
V2	5CL8	15K	†5000Ω	0Ω	7.5Ω	7Ω	†2400Ω	†240Ω	0Ω	220K
V3	5B8	0Ω	●1.3Meg	●†2.7Meg	6.5Ω	6.5Ω	1Meg	56Ω	†170Ω	†170Ω
V4	5B8	0Ω	2.2Meg	†12K	5.5Ω	5Ω	0Ω	180Ω	†170Ω	†170Ω
V5	6AW8A	0Ω	100K	†35K	3.5Ω	5Ω	● 10Ω	1.4Meg	†22Ω	†3300Ω
V6	3DT6	4.2Ω	680Ω	†3.5Ω	3Ω	‡700K	†2200Ω	680K		
V7	12CA5	120Ω	270K	9Ω	7.5Ω	270K	†22Ω	†430Ω		
V8	12L6GTB	TP	10.5Ω	†260Ω	†22Ω	●2.3Meg	TP	9Ω	0Ω	
V9	6SN7GTB	1.8Meg	†12K	1200Ω	●75K	†47K	1200Ω	1.5Ω	3Ω	
V10	12DQ6A	TP	10.5Ω	TP	†200Ω	440K	TP	11.5Ω	0Ω	TOP CAP ‡13Ω
V11	19AU4GT	NC	TP	480K	NC	†22Ω	TP	13Ω	11.5Ω	
V12	1X2B	PINS 1 THRU 9 HAVE INFINITE RESISTANCE								TOP CAP ‡453Ω
V13	14RP4	0Ω	3Ω	Pin 6 ‡27K	Pin 10 ‡27K	Pin 11 ●†120K	Pin 12 1.5Ω			

† MEASURED FROM OUTPUT OF M1.
‡ MEASURED FROM PIN 3 OF V11.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
NC NO CONNECTION
TP TIE POINT

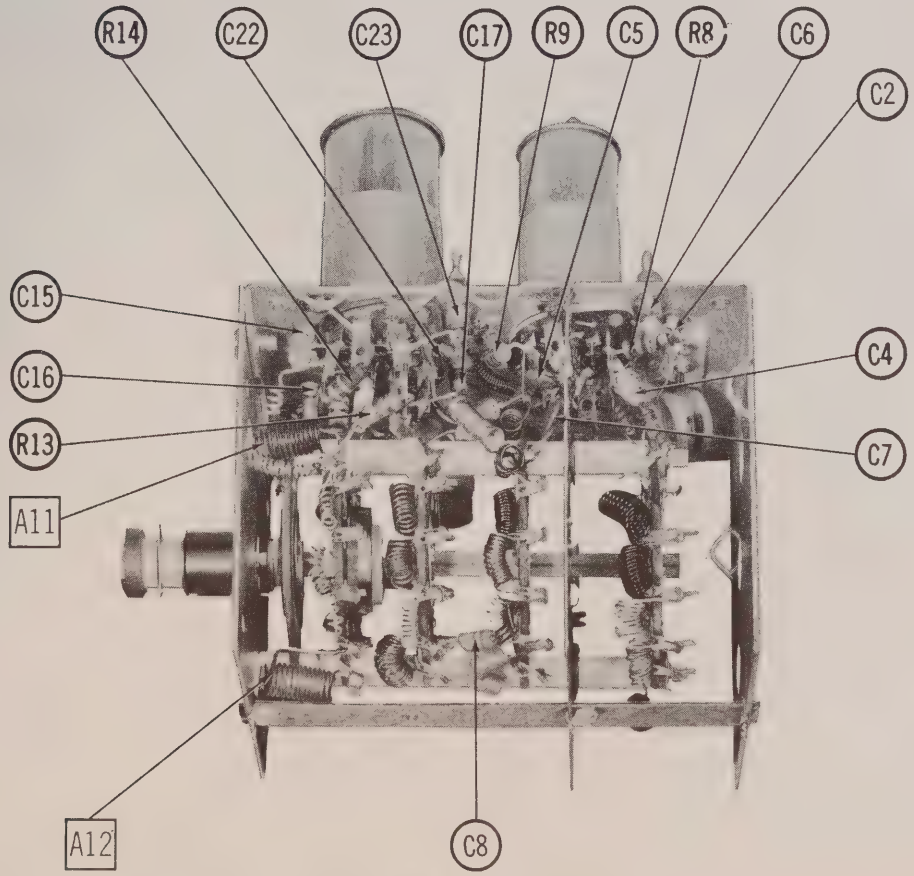


TUBE PLACEMENT CHART



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

RF TUNER-LEFT SIDE



RF TUNER-RIGHT SIDE

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amp.	3BC5	
V2	Mixer-Osc.	6CL6	
V3	1st Video IF - Vert. Mult.	6BH6	
V4	2nd Video IF - Sync Sep.	6BH6	
V5	Video Output-Sound IF	6AW8A	
V6	Audio Det.	3DT6	

ITEM No.	USE	TYPE	NOTES
V7	Audio Output	12DA5	
V8	Vert. Mult. - Vert. Output	12L6GT	
V9	Horiz. Mult.	6SN7GT/B	
V10	Horiz. Output	12DQ6A	
V11	Damper	1B3/GT	
V13	HV Rectifier	1X2B	

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	Hallicrafters PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V13	14RP4A		14RP4A * 14RP4	14RP4A	1 Aluminized 2 Super Screen 65

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP	VOLT	Hallicrafters PART No.	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	200	150	45A392	PH3-012		WT320	CDBT-4015	D-095 MT-1850	R2294 *
B	200	150							
C	20	150							

* Non catalog item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA								NOTES
	CAP	VOLT	Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.		
C2	2 ∨										
C3	470		47A636	BPD-00047	DD-47,	BYA107-47	ED-470	UC-5347	5GA-T47		
C4	5			BPD-00005	TC2-4R7	C1V5C	TCO-5	2T-5347	5TCB-V5		
C5	1000		47-503	BPD-001	DD-102	BYA-6D1	ED-1000	DC521	5HK-D1		
C6	4000			EF-001	MT 1-4000				503C-D1		
C7	47		47CA30A470M	BPD-000047	TC2-470	L10Q47	ED-47	UC-5447	5GA-Q47		
C8	1.5			NPO-81.5	TC2-1R5	C10V15C	TCO-1.5	2T-5515	5TCCB-V15		
C9	24										
C10	36										
C11	15			BPD-00015	DD-150	L10Q15	ED-15	UC-5415	5GA-Q15		
C12											
C13	100										
C14	2.0			NPO-81 2. 2	TC2-2. 2	C10V2C	TCO-2				
C15	15										N1000
C16	10			NPO-81 10	TC2-10	C10Q1C	TCO-10	2T-541	5TCC-Q1		
C17	1000			EF-001	MT1-1000				503C-D1		
C18	1000		47-503	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1		
C19	100										
C20	1000			EF-001	MFT-1000				503C-D1		
C21	1000		47-503	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1		
C22	1000		47-503	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1		
C23	1000			EF-001	MFT-1000				503C-D1		
C24	330		47A641	BPD-00033	DD-331	C10T33	ED-330	UC-5333	5GA-T33		
C25	470		47A543	BPD-00047	DD-471	BYA107-47	ED-470	UC-5347	5GA-T47		
C26	1000		47A230	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1		
C27	6.7		47B403-6	NPO-81 4. 7	TC2-4R7	C10V47C	TCO-4.7	2T-555	5TCCB-V47		
C28	47		47CA30A100K	BP 10	DB-006	L7Q47	GP-10	UC-541	5GA-Q47		
C29	.1	125		P36M-1	DF-104	CUB2P1		GEM-201	2TM-P1		Note 1
C30	68		47-635								W85
C31	.1	200	46D818-104M3	P36M-2	DF-104	CUB2P1		GEM-201	2TM-P1		
C32	1000		47A230	BPD-001	DD-101	BYA6D1	ED-1000	DC521	5HK-D1		
C33	33	100	46D818-324M1	P36M-23		CUB3P22		GEM-2022	2TM-P22		
C34	10		47A180-11	H 10	D6-100	L7Q1	GP-10	UC-541	5GA-Q1		NTS
C35	33		47-634								
C36	47		47CA30A470M	SI 47	D6-470	LT6Q47	GP-47	UC-5447	5GA-Q47		
C37	3		47A887	SI 3	D6-030	LT6V3	TCO-3	2T-553			
C38	10000		47-A234	BPD-01	DD-103	BYA6E1	ED-1K	DC521	5HK-S1		
C39	1000		47A230	BPD-001	DD-103	BYA6D1	ED-1000	DC521	5HK-D1		
C40	1000		47A230	BPD-001	DD-103	BYA6D1	ED-1000	DC521	5HK-D1		
C41	1000		47A230	BPD-001	DD-103	BYA6D1	ED-1000	DC521	5HK-D1		
C42	15		47B430								
C43	.047	200	46D818-473M3	BPD-05	DF-503	CUB3S47		GEM-2147	2TM-S47		ND80
C44	10000		47A234	BPD-01	DD-103	BYA6E1	ED-01	DC521	5HK-S1		
C45	10000		47A234	BPD-01	DD-103	BYA6E1	ED-01	DC521	5HK-S1		
C46	820		47-806	BPD-0008	DE-831	L10T82	ED-820		5GA-T82		
C47	2000		47A305	BPD-002	DD-302	BYA10D2	ED-002	DC522	5HK-D2		
C48	.063	100									
C49	.033	300		P36M-033	DF-303	CUB3S33		GEM-4133	6TM-S33		
C50	10000	600	47-805	P36M-01	DD-103	BYA10M1			10EKB-S1		
C51	1000	500	47-503	BPD-001	DD-103	BYA6D1	ED-001	DC521	5HK-D1		
C52	.0039	300	46D818-392K4	BPD-004	DE-403	CUB3D39	GP-4000	GEM-424	5TM-D4		
C53	100		47CA30A100M	SI 100	D6-101	LT6Y1	GP-100	UC-551	5GA-T1		
C54	47		47CA30A470M	SI 47	D6-470	LT6Q47	GP-47	UC-5447	5GA-Q47		
C55	1000		47A586	BPD-001	DD-103	BYA6D1	ED-1000	DC521	5HK-D1		
C56	.0047	300	46D818-473K3	BPD-0047	DE-472	CUB3D47	GP-4700	GEM-5247	6TM-D47		
C57	1000		47A586	BPD-001	DD-103	BYA6D1	ED-1000	DC521	5HK-D1		
C58	.1	200	46D818-104M3	P36M-1	DF-104	CUB2P1		GEM-201	2TM-P1		
C59	.0056	400	46S0562X4	P36M-005	DE-562	CUB4D5	GP-5600	GEM-425	5TM-D5		
C60	330		47X3033K	1484-00033		SWT333			MS-353		
C61	330		47X3033K	1484-00033		SWT333			MS-347		
C62	470		47A530	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47		
C63	.15	600	46D818-154M6	P68M-15		CUB6P15		GEM-6015	6TM-P15		
C64	150	3000	47-846		DD30-151	HV150T10			30GA-T12		
C65	56	3000	47A527		DD30-56	HVA20Q56	HD3-56	DC30456	30GA-Q56		
C66	.22	600		P68M-23		CUB6P22		GEM-6023	6TM-P22		
C67	1000		47A230	BPD-001	DD-103	BYA6D1	ED-1000	DC521	5HK-D1		
C68	10000		47A234	BPD-01	DD-103	BYA6E1	ED-01	DC521	5HK-S1		
C69	.22	300	46D818-224M6	P36M-23		CUB3P22		GEM-2022	2TM-P22		
C70	.22	600	46D818-224M6	P68M-22		CUB6P22		GEM-6022	6TM-P22		
C71	.1	200	46D818-104M3	P36M-1	DF-104	CUB2P1		GEM-201	2TM-P1		

Note 1: Some versions may use .047☐ 300V (part #46D818-473M3) in this application.

PARTS LIST AND DESCRIPTIONS

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Hallicrafters PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	50K	1	25B4400	B-50	A47-50K-/-/	Q13-122	TA336A	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KB-1	SWK-12	T6-1	L6-26	
R2A	1500Ω	1	25B1599	B-15		Q17-109	U5	Contrast
B	Shaft			Not Req.		Not Req.	Not Req.	
R3A	5Meg	1	25B1401			Q17-141	TA5BH	Brightness
B	Shaft					Not Req.	Not Req.	
R4A	1.5Meg	1	25B1402	B-T4B		A47-1.5Meg-/-	Q13-138	Vert. Hold
B	Shaft			Not Req.		FS-3	Not Req.	
R5A	75K	1	25-1305	B-35		A47-75K-/-	Q11-125	Horiz. Hold
B	Shaft			Not Req.		FS2-1/2	Not Req.	
R6A	2Meg	1	25B1396					Vert. Linearity
B	5Meg							Height With 1Meg Stop

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	OHMS	WATT	Hallicrafters PART No.	IRC PART No.		
R7	220K		23X2032243K	BTS-220K		
R8	12K		23X2031233K	BTS-12K		
R9	4700Ω		23X2034723K	BTS-4700		
R10	4700Ω		23X2034723K	BTS-4700		
R11	220K		23X2032243K	BTS-220K		
R12	2200Ω		23X2032223K	BTS-2200		
R13	4700Ω		23X2034723K	BTS-4700		
R14	15K		23X2031533K	BTS-15K		
R15	220Ω		23X2032213K	BTS-220		
R16	1Meg		23X2031056K	BTS-1Meg		
R17	10K		23X2031033K	BTS-10K		
R18	150Ω		23X2031513K	BTS-150		
R19	56Ω		23X2035603K	BTS-56		
R20	150Ω		23X2031513K	BTS-150		
R21	180Ω		23X2031813K	BTS-180		
R22	6800Ω		23X2036823K	BTS-6800		
R23	2.7Meg		23X2032753K	BTS-2.7Meg		
R24	3.3Meg		23X2033353K	BTS-3.3Meg		
R25	33005	T	24A1D33	PWT-3300		
R26	27K		23X2032733K	BTS-27K		
R27	120K		23X2032043K	BTS-120K		
R28	100K		23X2032043K	BTS-100K		
R29	33K		23X2033333K	BTS-33K		
R30	680K		23X2036843K	BTS-680K		
R31	270K		23X2032743K	BTS-270K		
R32	680K		23X2036843K	BTS-680K		
R33	680Ω		23X2036813K	BTS-680		
R34	2200Ω		23X2032223K	BTS-2200		
R35	120Ω		23X2031213K	BTS-120		
R36	27K	1	23X2032733K	BTA-27K		
R37	1680		23X2031613K	BTS-160		

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	OHMS	WATT	Hallicrafters PART No.	IRC PART No.		
R38	15K		23X2031533K	BTS-15K		
R39	12K		23X2031233K	BTA-12K		
R40	18K	1	23X2031833K	BTA-18K		
R41	68K		23X2036833K	BTS-68K		
R42	100K		23X2031044K	BTS-100K		
R43	470K		23X2034743K	BTS-470K		
R44	180K		23X2031843K	BTS-180K		
R45	100K		23X2031044K	BTS-100K		
R46	100K		23X2031044K	BTS-100K		
R47	100K		23X2031044K	BTS-100K		
R48	1.5Meg		23X2031556K	BTS-1.5Meg		
R49	180Ω		23X2031813K			
R50	180Ω		23X2031818K			
R51	220K		23X2032243K	BTS-220K		
R52	1Meg		23X2031056K	BTS-1Meg		
R53	470Ω		23X2034713K	BTS-470Ω		
R54	1Meg		23X2031056K	BTS-1Meg		
R55	1Meg		23X2031056K	BTS-1Meg		
R56	33K		23X2033333K	BTS-33K		
R57	12K		23X2031233K	BTS-12K		
R58	56K		23X2035633K	BTS-56K		Note 1
R59	47K		23X2034733K	BTS-47K		
R60	390K		23X2033943K	BTS-390K		
R61	1800Ω 5%		23X2031823J	BTS-1800 5%		
R62	3300Ω		23X2033323K	BTS-3300		
R63	390K		23X2033943K	BTS-390K		
R64	47K		23X2034733K	BTS-47K		
R65	180Ω		23X2031813K	BTS-180		
R66	5800Ω		23X2035823K	BTS-5800		
R67	39Ω	10	24-1068	1 3/4A-35		Note 2
R68	4.7Ω	5	24B3R4			

Note 1: Some versions may use an 82K (part #23X2X8232K), an 82K paralleled by 150K, or a 68K (part #23X2X6833K) in this application.
Note 2. Alternate part #24A1068 used in Ch. B2010.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA						
		Hallicrafters PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	Horiz. Output Trans.	55-304							
T2	Vert. Output Trans.	55-309	21900 ①				26875 ②		
T3	Yoke(90°) Horiz.24.5MB 53-398 Vert.(11.5MB)								

① Connect #1 to plate; #2 to B- ; #7 to yoke terminal #4; #10 to yoke terminal #8.
② Connect #1 to plate; #3 to B- ; #7 to yoke terminal #6; #10 to yoke terminal #4.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI	SEC	Hallicrafters PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T4	4500Ω	3-4Ω	55C306	Z1107 ①	A-3026	A-3977 ②	34B81 ③	S-8X	① Drill one new mtg. hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Hallicrafters PART No.	QUAM PART No.	
SP1	6"	PM	3-4Ω	85C175	4A07	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Hallicrafters PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.		
L1	1st Video IF	51-2167					
L2	2nd Video IF	51-2168					
L3	3rd Video IF	50-668					
L4	RF Choke	53A307	19-1008		4684		18 Microhenries
L5	Shunt Peaking Coil	51-2103	19-3060		6148		750 Microhenries
L5A	4.5MC Trap	51B1096					
B	1st Sound IF						
L7	Shunt Peaking Coil	51-3101	19-4400a		6134a		396 Microhenries; Wound on 3900Ω resistor.
L8	Series Peaking Coil	51-3184	19-3160 *		6130 *		180 Microhenries, wound on 27K resistor
L9	2nd Sound IF	51-2166					
L10	Quadrature Coil	51B1807			1480		
L11	RF Choke	53-342					7.5 Microhenries; IRC part #C-5A

* Parallel with 3900Ω resistor
* Parallel with 27K resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI	SEC	Hallicrafters PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Rem PART No.	Thordarson PART No.	
L12			51-2169	19-1579		6310 ①			RH-4	

① Enlarge mounting hole. A 3900MMF capacitor may have to be used in place of .0056 (C54).

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE @ CURRENT 1000 ∨☐	Hallicrafters PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L13	.280A	22Ω	.5HY	56A253	C-5041 ①	C-2996 ①	C-2326 ①	28C44 ①	C-33X ①

① Drill one new mtg. hole.

COMPONENT COMBINATIONS

ITEM No.	USE	DISCRIPTION	REPLACEMENT DATA	
		Hallicrafters PART No.		
K1	Sync Coupler	270MMF, 25MMF, 10000MMF, 330K, 2.2Meg	49A046	Aerovox PA-533 Centralab PC-263 Sprague ST-3

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA							
	CURRENT (Measured)	Hallicrafters PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.
M1	280A	27C239 ①,	1033A ↓,	1N1907 ③	RS3508L ①	6S350 ①	6QA3 ①	350A ①
M2		27C226 ↓	1215 ↓ ②		IT1 ① ③			

① Selenium type.
② Germanium type.
③ 2 required.

CRYSTAL DIODES

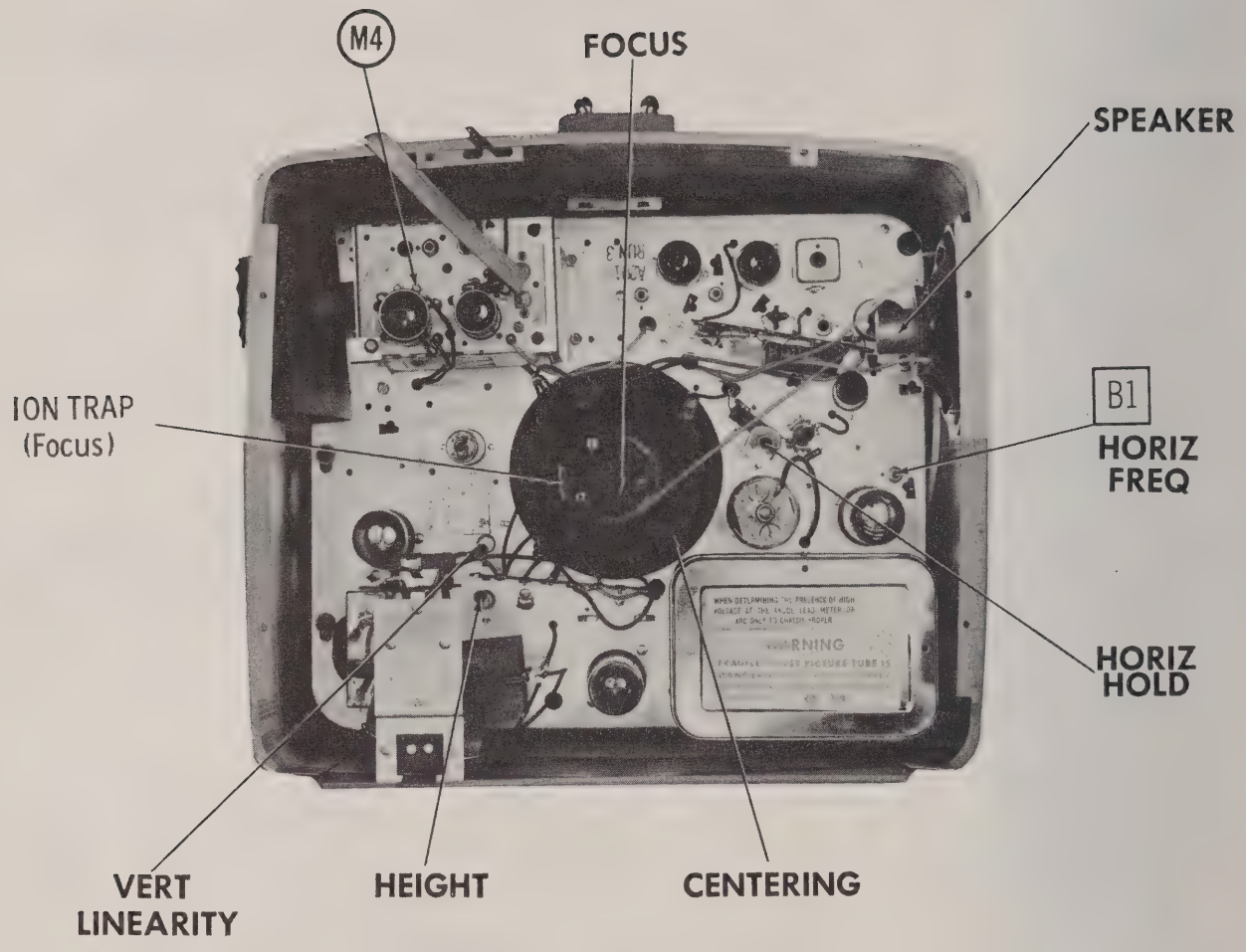
ITEM No.	ORIG TYPE	REPLACEMENT DATA		NOTES
		Hallicrafters PART No.	SYLVANIA PART No.	
M3	1N80*	19C1980	1N80	Video Detector (Pigtail)

* A CK-706A or 1N295 may be used in this application.

MISCELLANEOUS

ITEM No.	PART NAME	Hallicrafters PART No.	NOTES
M4	Tuner	1-3067	VHF Used in Chassis A2010
	Tuner	1-3093	UHF, VHF Used in Chassis B2010
M5	Centering Device	21B216	
M6	Ion Trap	21B188	
	Safety Glass	22D534	
	Knob	19B1055	Control (4 used)
	Knob	19A1040	VHF Channel Selector, Models 14TS780T, M, B
	Knob	19C1039	Fine Tuning Models 14TS780T, M, B
	Knob	19A1074	VHF Channel Selector, Models 14TS781T, M, B
	Knob	19C985	UHF Tuning, Models 14TS781T, M, B
	Knob	19C980	Calibrated Insert, Models 14TS781T, M, B

HALLICRAFTERS MODELS 14TS780B, M, T, 14TS781B, M, T (Ch. A2010, B2010)

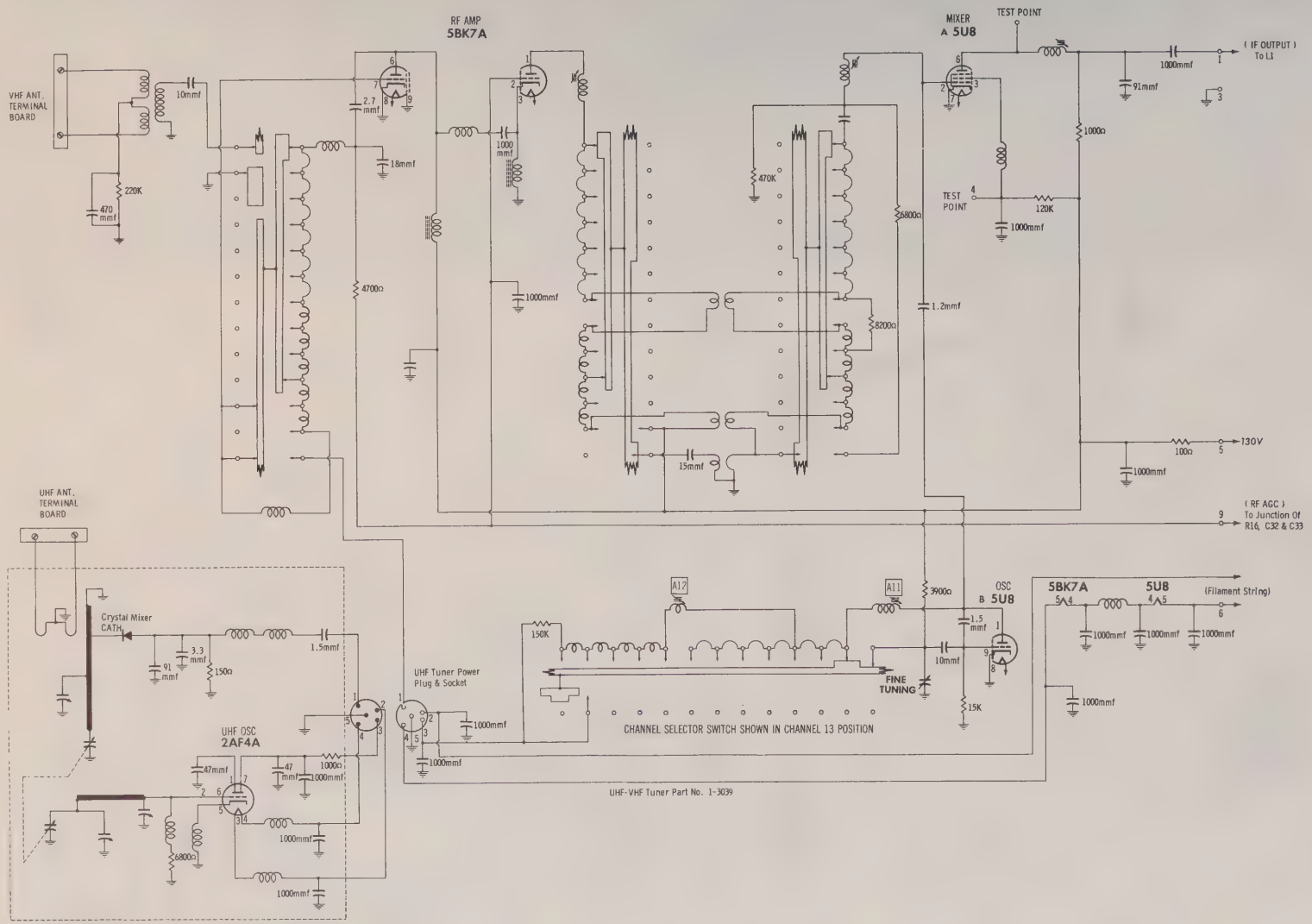


CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL OSCILLATOR ADJUSTMENTS

1. Turn the set on and tune in a TV station, preferably with a test pattern.
2. Set the horizontal hold control to its mid-range position and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.
3. Check other stations and if necessary, retouch B1 for best sync action on all channels.



ALTERNATE TUNER SCHEMATIC

HOTPOINT MODELS 9S101, 9S102 ("T" Line)

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Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MODEL 9S101 ("T" LINE)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TRADE NAME	Hotpoint Models 9S101, 9S102 (Chassis "T" Line)
MANUFACTURER	Hotpoint Co., 5600 W. Taylor St., Chicago 44, Ill.
TYPE SET	Television Receiver
TUBES	Thirteen
POWER SUPPLY	110-125 Volts AC, 60 Cycles RATING 67 Watts; .75 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45. 75MC, Sound IF 41. 25MC (Intercarrier)

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HOTPOINT MODELS 9S101, 9S102 ("T" Line)

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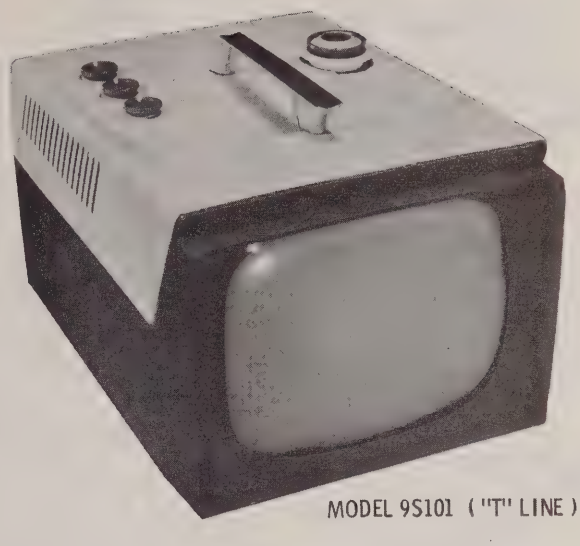
DISASSEMBLY INSTRUCTIONS

CHASSIS & PICTURE TUBE REMOVAL

1. Remove 5 push-on type control knobs from the top.
2. Remove 8 chassis bolts from the bottom. (Three on each side, two at rear).
3. Remove chassis from the front of the cabinet.
4. Remove picture tube socket, Ion trap and centering device.
5. Loosen the yoke clamp by loosening the wing nut.
6. Remove the screw from the bottom mounting board retaining the cabinet front locking slide. This screw is located on the inside at the bottom left side of the front.
7. Move the slide to the left allowing the cabinet front mounting studs to drop through the holes in the front of the chassis mounting board.
8. The cabinet front and picture tube assembly may then be removed from the main chassis by passing the neck of the tube forward out of the yoke.
9. Remove the 4 springs from the tube clamping ring around the bell of the tube.
10. The tube is now free of the cabinet front and face glass for service or cleaning.

NOTE: Always use water and mild soap for cleaning the safety glass.



MODEL 9S101 ("T" LINE)

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS

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HOTPOINT MODELS 9S101, 9S102 ("T" Line)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the channel selector and fine tuning knobs. Set the fine tuning at the center of its range. The adjustments (located in a circle around the shaft) should be made in sequence from the highest to the lowest channel in the area. Channel 13 adjustment is located at 1 o'clock, proceed in a counter clockwise direction adjusting for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

To clean the picture tube and safety glass it is necessary to remove the chassis and the picture tube. (See disassembly instructions.)

FOCUS

Adjust the Ion trap for the best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Set the horizontal hold to the center of its range. Adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (A7) located on top of chassis.

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart.)

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

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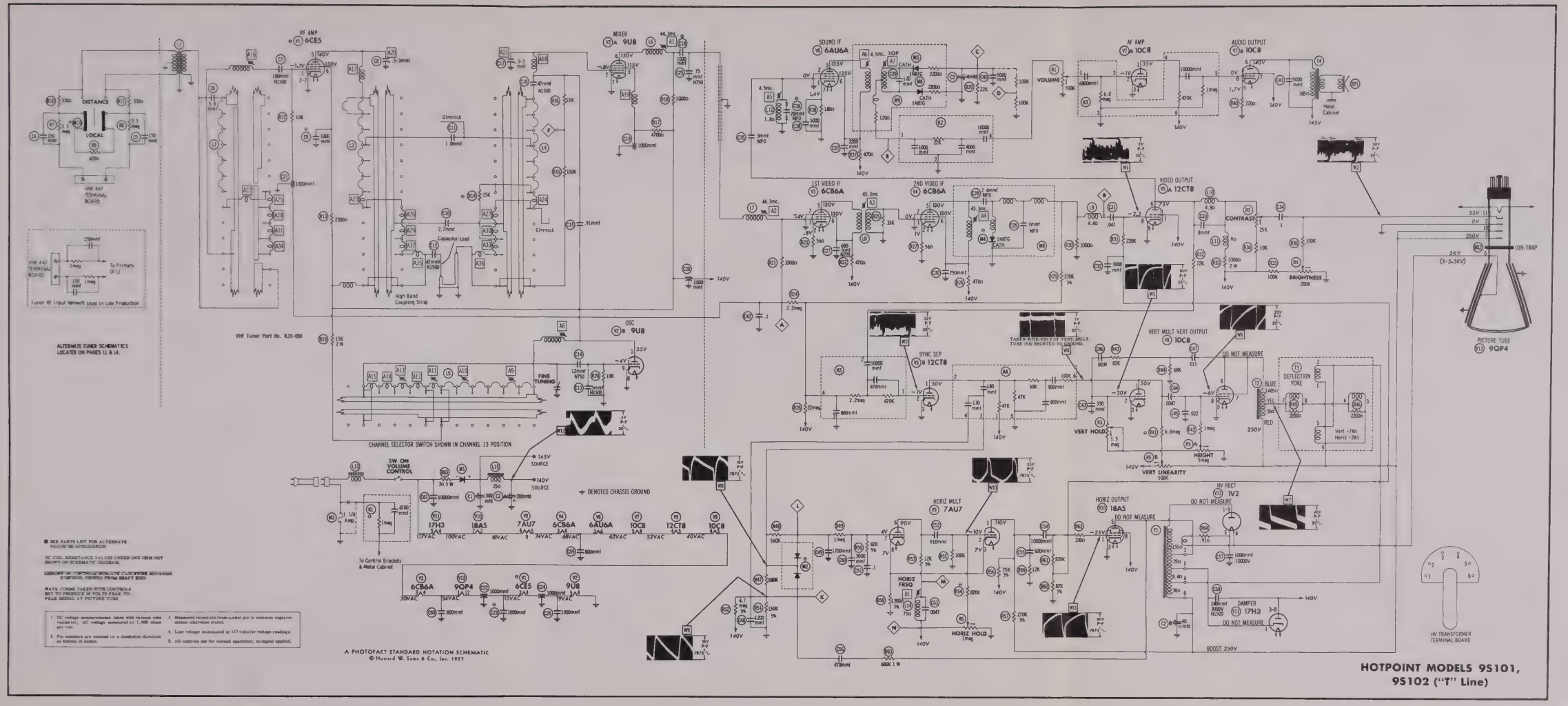
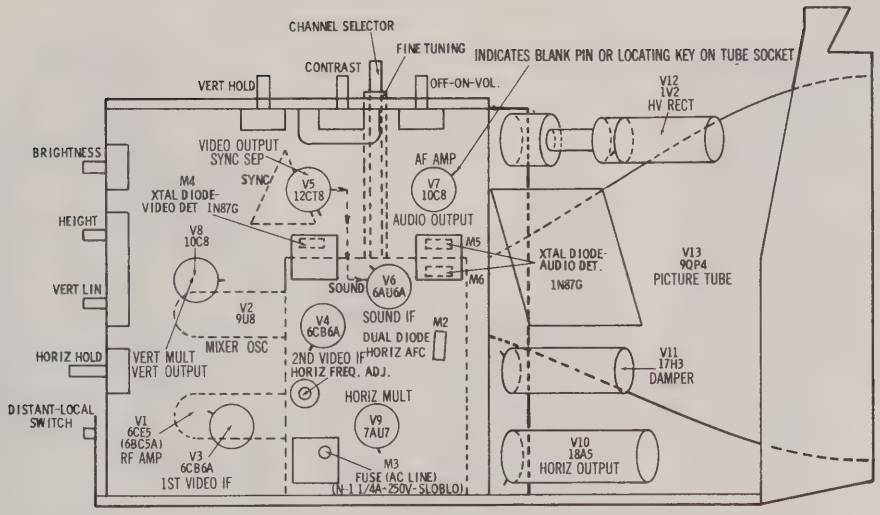


HOTPOINT MODELS 9S101, 9S102 ("T" Line)

TUBE PLACEMENT CHART



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TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

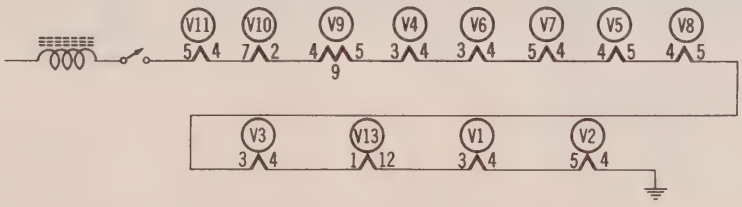
POWER SUPPLY FAILURE
No raster, no sound - Fuse (M3), Rectifier (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V3, V4, Diode (M4), V5
No pic, no sound, has snow - V1, V2
No pic, has sound, has raster - V5, V13
Has pic, no sound - V6, V7

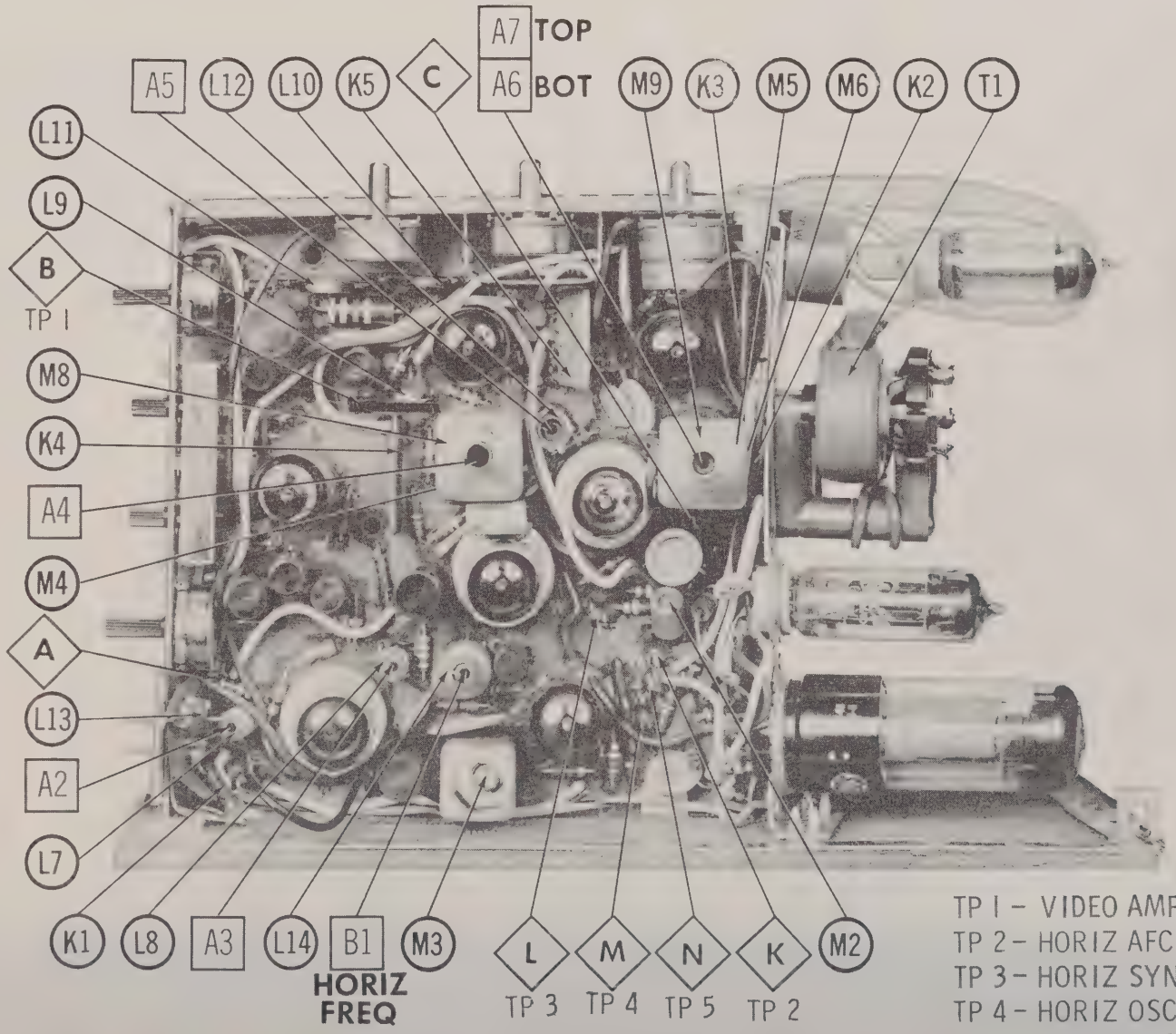
SYNC FAILURE
No vert. sync - V5
No horiz. sync - V5, Diode (M2)
No vert. or horiz. sync - V5

SWEEP FAILURE
No raster, has sound - V8, V10, V11, V12, V13
No vertical deflection - V8
Poor vert. linearity or foldover - V8
Poor horiz. linearity or foldover - V9, V10, V11
Narrow picture - V9, V10, V11, M1
Vert. off freq. - V8
Horiz. off freq. - V9

This receiver employs tubes used in a series filament network, an open filament in any tube in the series will cause the set to be inoperative. (See circuit below.)



SET 363 FOLDER 11



TP 1 – VIDEO AMP – 0V
TP 2 – HORIZ AFC – 3.6V
TP 3 – HORIZ SYNC – 4.5V
TP 4 – HORIZ OSC – 120V
TP 5 – HORIZ OSC – 140V

CHASSIS TOP VIEW

CAPACITOR IDENTIFICATION

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
Allow a 30 minute warm-up period for the receiver and test equipment.

VIDEO IF ALIGNMENT

Turn volume control fully counter clockwise and contrast control fully clockwise. Turn fine tuning fully counter clockwise.
Connect the negative lead of a 3 volt bias supply to point Ⓐ. Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over mixer-osc. tube (VT). Low side to chassis. Use very short shielded leads.	Not used.	44.3MC (unmod)	11	USE VTVM DC probe to point Ⓓ thru 10K. Common to chassis.	A1	Use only enough generator output to provide usable indication on VTVM.
2.	"	"	"	44.3MC	"	"	A2	"
3.	"	"	"	45.3MC	"	"	A3	"
4.	"	"	"	43.3MC	"	"	A4	"
5.	"	"	44.3MC (30MC Swp)	41.25MC 43.85MC 44.3MC 45.0MC 45.75MC	"	Vert. amp thru 22K to point Ⓓ. Low side to chassis.	A1, A2, A3, A4	Adjust A1 and A2 simultaneously for maximum gain of response curve similar to Fig. 1. Adjust A4 to position 44.3MC and 43.85MC markers as in Fig. 1. Retouch A3 to place 45.75MC marker at 50% on curve. Retouch A1 and A2 to shape peak region of curve, if necessary.

SOUND IF ALIGNMENT

Connect two matched 100Ω (±1%) resistors in series from point Ⓒ to chassis. The junction of these two resistors is alignment point Ⓔ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	Direct	High side to point Ⓔ. Low side to chassis.	4.5MC (unmod)	Any non-interfering channel.	DC probe to point Ⓔ. Common to chassis.	A5, A6	Adjust for maximum deflection on VTVM.
7.	"	"	"	"	DC probe to point Ⓒ.	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 6 and 7.

If 4.5MC generator of crystal accuracy is not available, a station signal may be used.

VHF OSCILLATOR ALIGNMENT FOR TUNERS #RJX-084 AND #RJX-085

Connect bias as under "Video IF Alignment".
Set the fine tuning control 2/3 turn from fully counter clockwise.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Fig. 3	Thru dummy antenna (Fig. 3) across primary of antenna matching transformer (L1).	213MC (30-15MC Swp)	211.25MC	13	Vert. amp thru 10K to point Ⓓ. Low side to chassis.	A8	Adjust so that marker falls at 50% on response curve as in Fig. 3.
9.	"	"	203MC (30-15MC Swp)	199.25MC	11	"	A9	"
10.	"	"	183MC (30-15MC Swp)	181.25MC	9	"	A10	"
11.	"	"	85MC (30-15MC Swp)	83.25MC	6	"	A11	"
12.	"	"	79MC (30-15MC Swp)	77.25MC	5	"	A12	Adjust by means of expanding or compressing coil turns. Adjust so that marker falls at 50% as in Fig. 3.
13.	"	"	69MC (30-15MC Swp)	67.25MC	4	"	A13	Same as step 8.
14.	"	"	63MC (30-15MC Swp)	61.25MC	3	"	A14	Same as step 12.
15.	"	"	57MC (30-15MC Swp)	55.25MC	2	"	A15	"

VHF RF AND MIXER ALIGNMENT FOR TUNERS #RJX-084 AND #RJX-085

Connect bias as under "Video IF Alignment".
When checking response, tuner shield must be in place.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.	Fig. 3	Thru dummy antenna (Fig. 3) across primary of antenna matching transformer (L1).	211.25MC (30MC Swp)	211.25MC 215.75MC	13	Vert. amp thru 10K to point Ⓓ. Low side to chassis.	A16, A17, A18, A19	Adjust A16, A17 and A18 for maximum gain and symmetry with markers placed as in Fig. 4. Bandwidth is varied by changing position of C13 with respect to adjacent coil. If necessary, adjust A19 SLIGHTLY to reduce dip or tilt.
17.	"	"	177MC (30MC Swp)	175.25MC 179.75MC	7	"	A20, A21	Adjust for maximum gain and symmetry similar to Fig. 4 with markers as indicated. Repeat step 16 retouching A16, A17 & A18, if necessary.
18.	"	"	207MC (30MC Swp) 203MC (30MC Swp) 193MC (30MC Swp) 189MC (30MC Swp) 183MC (30MC Swp)	205.25MC 208.75MC 199.25MC 203.75MC 193.25MC 197.75MC 187.25MC 191.75MC 181.25MC 185.75MC	12 11 10 9 8	"		Make compromise adjustments of A20 and A21 for channels 13 thru 7, if necessary. Replace tuner shield when checking response.
19.	"	"	85MC (30MC Swp)	83.25MC 87.75MC	6	"	A22, A23, A24,	Adjust for curve similar to Fig. 5. Adjusted in numerical order, the bandwidth is first affected, then the sound side of the curve, then the video side. Replace tuner shield when checking response.

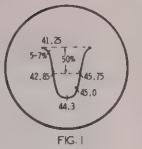
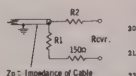


FIG. 1



Zo = Impedance of Cable

Zo	R1	R2
50Ω	56Ω	120Ω
75Ω	82Ω	110Ω

FIG. 2

FIG. 3

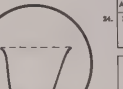


FIG. 4

FIG. 5

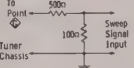


FIG. 6

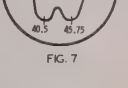


FIG. 7

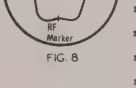


FIG. 8

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
20.	"	"	79MC (30MC Swp)	77.25MC 81.75MC	5	"	A25, A26, A27	"
21.	"	"	69MC (30MC Swp)	67.25MC 71.75MC	4	"	A28, A29, A30	"
22.	"	"	63MC (30MC Swp)	61.25MC 65.75MC	3	"	A31, A32, A33	"
23.	"	"	57MC (30MC Swp)	55.25MC 59.75MC	2	"	A34, A35 A36	"

40MC CHANNEL ALIGNMENT OF VHF TUNER #RJX-085

Connect bias as under "Video IF Alignment".
Remove IF link from L7 and terminate with 68Ω carbon resistor at open end.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
24.	Fig. 6	High side thru network (Fig. 6 to point Ⓓ. Low side to tuner chassis.	230MC (30MC Swp)	40.5MC 45.75MC	Between channels 38 & 39.	Vert. amp thru 10K to point Ⓓ. Low side to chassis.	A37, A38, A39	Adjust A37 for maximum gain at 40.5MC marker and A38 for maximum gain at 45.75MC marker. Adjust A39 for maximum gain and MINIMUM tilt as in Fig. 7.

VHF OSCILLATOR ALIGNMENT FOR TUNER #RJX-094

Connect bias as under "Video IF Alignment".
Set fine tuning 10-15 degrees from full clockwise. When checking response, the tuner shield must be in place.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
25.	Fig. 3	Thru dummy antenna (Fig. 3) across primary of antenna transformer.	213MC (30MC Swp)	211.25MC	13	Vert. amp thru 47K to point Ⓓ. Low side to chassis.	A40	Adjust so that marker falls at 50% on curve as in Fig. 3. Adjust A41 thru A46 and A48 thru A51 by compressing or expanding coil turns.
			207MC (30MC Swp)	205.25MC	13		A41	
			203MC (30MC Swp)	199.25MC	11		A42	
			193MC (30MC Swp)	193.25MC	10		A43	
			189MC (30MC Swp)	187.25MC	9		A44	
			183MC (30MC Swp)	181.25MC	8		A45	
			177MC (30MC Swp)	175.25MC	7		A46	
			85MC (30MC Swp)	83.25MC	6		A47	
			79MC (30MC Swp)	77.25MC	5		A48	
			69MC (30MC Swp)	67.25MC	4		A49	
			63MC (30MC Swp)	61.25MC	3		A50	
			57MC (30MC Swp)	55.25MC	2		A51	

RF AND MIXER ALIGNMENT FOR TUNER #RJX-094

Connect the negative lead of a 3 volt bias supply to point Ⓐ. Positive to chassis.
When checking response, tuner shield must be in place.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide usable pattern on scope.
Detune A1 by turning counter clockwise 3 turns. After completing alignment, readjust A1 as under "Video IF Alignment".
Disconnect link from tuner output leaving the ground wire connected. Connect a 100Ω resistor from tuner output link to chassis.
Adjustment of the gimmick of the 36MMF coupling capacitor will affect the bandwidth.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
26.	Fig. 2	Thru dummy antenna (Fig. 2) across primary of antenna matching transformer (L1).	213MC (30MC Swp)	211.25MC 215.75MC	13	Vert. amp thru 10K to point Ⓓ. Low side to chassis.	A53, A55, A54, A56	Adjust by compressing or expanding coil turns for maximum gain and symmetry similar to Fig. 4. Adjust A53 for sound side of curve. Adjust A55 for video side of curve.
27.	"	"	207MC (30MC Swp)	205.25MC 209.75MC	13	"	A58, A57, A59	Adjust by compressing or expanding coil turns for curve similar to Fig. 4. Adjust in numerical order. The bandwidth is the first adjustment, then the sound side of curve and then the video side.
28.	"	"	203MC (30MC Swp)	199.25MC 203.75MC	11	"	A60, A60, A61	"
29.	"	"	193MC (30MC Swp)	193.25MC 197.75MC	10	"	A62, A63, A64	"
30.	"	"	189MC (30MC Swp)	187.25MC 191.75MC	9	"	A65, A66, A67	"
31.	"	"	183MC (30MC Swp)	181.25MC 185.75MC	8	"	A68, A69, A70	"
32.	"	"	177MC (30MC Swp)	175.25MC 179.75MC	7	"	A71, A72, A73	"
33.	"	"	85MC (30MC Swp)	83.25MC 87.75MC	6	"	A74, A75, A76	Adjust by compressing or expanding coil turns for curve similar to Fig. 5. Adjust in numerical order, the bandwidth is the first adjustment, then the sound side of curve and then the video side.
34.	"	"	79MC (30MC Swp)	77.25MC 81.75MC	5	"	A77, A78, A79	"
35.	"	"	69MC (30MC Swp)	67.25MC 71.75MC	4	"	A80, A81, A82	"
36.	"	"	63MC (30MC Swp)	61.25MC 65.75MC	3	"	A83, A84, A85	"
37.	"	"	57MC (30MC Swp)	55.25MC 59.75MC	2	"	A86, A87, A88	"

ALIGNMENT INSTRUCTIONS (cont)

UHF TUNER ALIGNMENT

If UHF tuner has to be removed from its mounting for alignment, extend cables and ground to main chassis.
For 43.5MC marker, connect a separate generator loosely to UHF IF input jack.
Connect bias as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
38.	Fig. 2	Across UHF antenna terminals thru antenna matching network (Fig. 2).	460MC (10MC Swp)	43.5MC 460MC	UHF Rotate UHF tuner shaft fully counter clockwise.	Vert. amp. thru 10K to point (F). Low side to chassis.	A89	Adjust A89 to make 460MC marker coincide with 43.5MC marker.
39.	"	"	910MC (10MC Swp)	43.5MC 910MC	Rotate UHF tuner shaft fully clockwise.	"	A90	Adjust A90 with a plastic crochet needle or similar device to make 910MC marker coincide with 43.5MC marker. Repeat steps 38 and 39 until marker coincidence is achieved on both ends of the band.
40.	"	"	530MC (10MC Swp)	43.5MC 530MC	Rotate UHF tuner shaft until 530MC marker coincides with 43.5MC marker.	"		Connect a short between the two feed thrus nearest the crystal diode mounting. (Do not short to chassis.)
41.	"	"	"	530MC	Leave as above.	Disconnect coaxial cable from VHF tuner and connect a 33Ω carbon resistor from inner conductor to shield. Connect vert. amp. across the 33Ω resistor thru an audio amplifier.	A91, A92	Use maximum gain on scope and amplifier and adjust sweep output to provide 2 inch peak to peak response curve on scope. Adjust A91 and A92 to obtain symmetrical response curve similar to Fig. 8. Remove the short from the feed-thrus. Remove the amplifier and 33Ω resistor and connect coaxial cable to VHF tuner.
42.	"	"	880MC (10MC Swp)	43.5MC 880MC	Rotate UHF tuner shaft to make 880MC marker coincide with 43.5MC marker.	Vert. amp. thru 10K to point (F). Low side to chassis.		
43.	"	"	"	880MC	Leave as above.	Same as step 41.	A93, A94	Use maximum gain on scope and amplifier and adjust sweep output to provide 2 inch peak to peak response curve on scope. Adjust A93 and A94 to give symmetrical response curve similar to Fig. 8. Remove the short from feed thrus. Remove amplifier and 33Ω resistor and connect coaxial cable to VHF tuner. Repeat steps 40 thru 43 until symmetrical response is obtained at both 530MC and 880MC.

Check the response curve over the entire UHF band and check for abnormally low gain points within the tuning range. This is usually caused by insufficient oscillator injection and is checked by measuring the crystal current. To do this, disconnect UHF output cable and connect a 0-5MA meter across output cable. The crystal current should be between .65MA and 3MA under normal conditions. If the reading is outside these limits, adjust the oscillator injection loop position (A95) with respect to the crystal clip terminal.

RESISTOR IDENTIFICATION

HOTPOINT MODELS 9S101, 9S102 ("T" Line)

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6CE5	2.4Meg	0Ω	7Ω	4.5Ω	† 25Ω	† 2200Ω	0Ω		
V2	9U8	† 15K	160K	† 4700Ω	0Ω	4.5Ω	† 1000Ω	0Ω	0Ω	10K
V3	6CB6A	2.4Meg	56Ω	11.5Ω	9Ω	† 500Ω	† 500Ω	0Ω		
V4	6CB6A	.1Ω	56Ω	32Ω	30Ω	† 500Ω	† 500Ω	0Ω		
V5	12CT8	† 25K	2.7Meg	0Ω	22Ω	16Ω	† 3300Ω	† 25Ω	300K	0Ω
V6	6AU6A	1.8Ω	0Ω	30Ω	27Ω	† 500Ω	† 500Ω	180Ω		
V7	10C8	† 470K	6.8Meg	0Ω	22Ω	27Ω	† 385Ω	† 25Ω	1Meg	220Ω
V8	10C8	•† 8Meg	• 5.5Meg	0Ω	16Ω	11.5Ω	‡1500Ω	‡1500Ω	• 1.2Meg	0Ω
V9	7AU7	† 75K	80K	1300Ω	36Ω	32Ω	† 12K	1.7Meg	1300Ω	34Ω
V10	18A5	900K	36Ω	0Ω	NC	‡25Ω	NC	44Ω	† 25Ω	
V11	17H3	¶	NC	† 25Ω	44Ω	52Ω	NC	NC	† 25Ω	
V12	1V2	‡ 180Ω	PINS	2 THRU 8	HAVE	INF	RESISTANCE			‡180Ω
V13	9QP4	9Ω	0Ω	‡7.5Ω	PIN 6 INF	PIN 10 ‡7.5Ω	PIN 11 • 350K	PIN 12 7Ω		

¶ THIS READING WILL VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

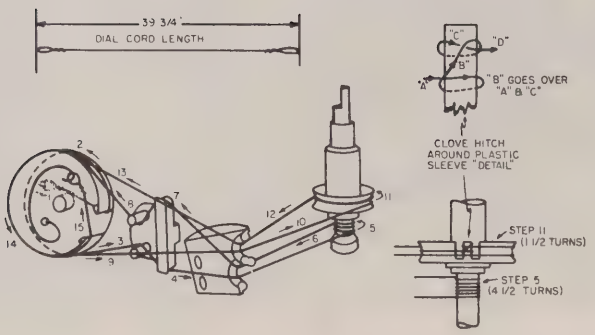
† MEASURED FROM OUTPUT OF M1.

‡ MEASURED FROM PIN 1 OF V11.

• THIS READING WILL VARY CONTROL SET FOR NORMAL OPERATION.

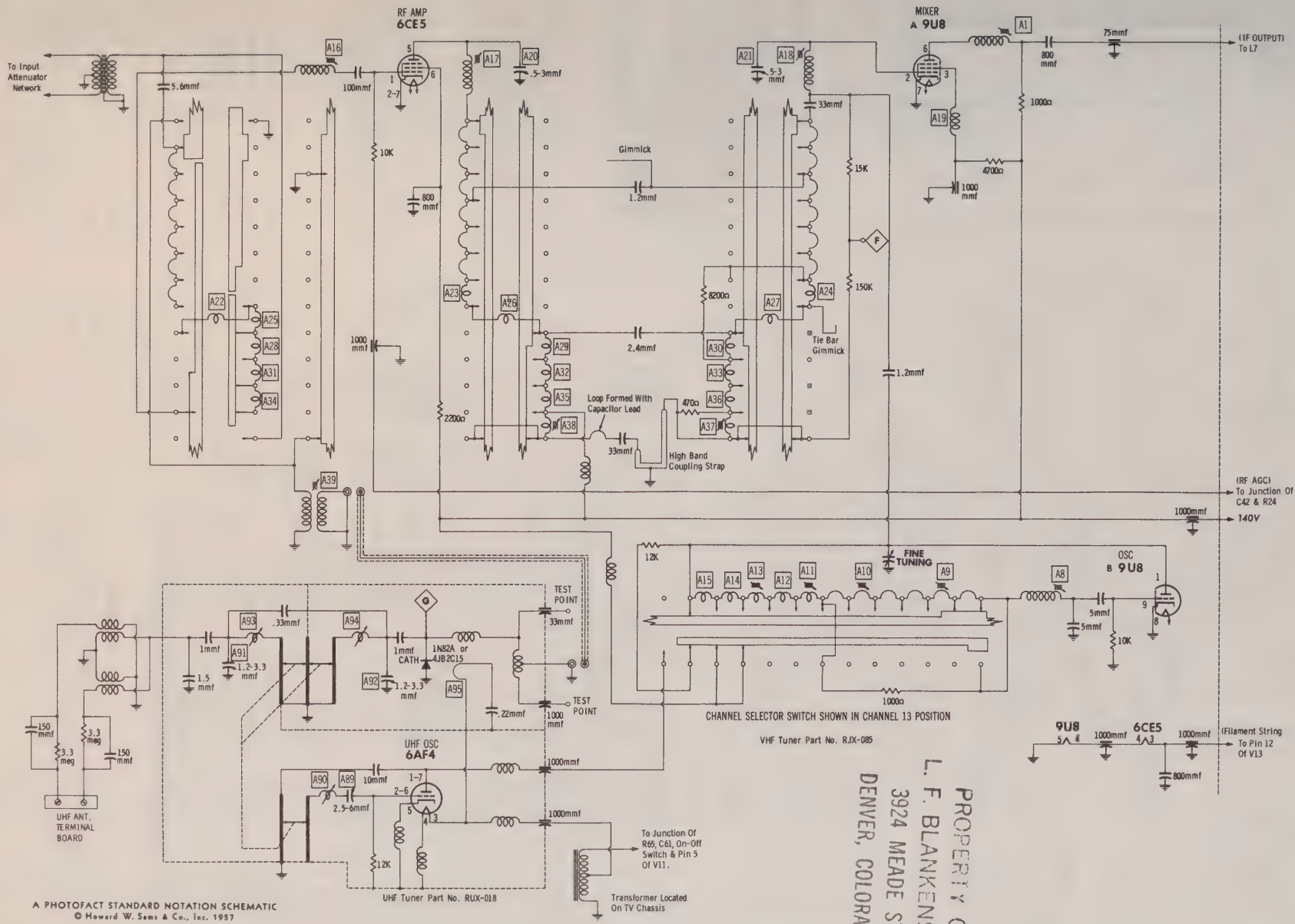
HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Turn the set on and tune in a TV station preferably with a test pattern.
2. Connect lead from point (K) to point (L).
3. Connect a 1000Ω resistor across horizontal freq. coil (L14) from point (M) to point (N).
4. Adjust horizontal hold control so that the picture floats back and forth across the screen.
5. Remove the resistor from across L14 and adjust B1 (horiz. freq. slug) so that the picture again floats back and forth across the screen.
6. Remove clip lead from point (K) to point (L). Readjust the horizontal hold control, if necessary.



POSITION OF PULLEYS & FINE TUNING PLATE ARE IN EXTREME COUNTER CLOCKWISE POSITION.

UHF DRIVE CORD STRINGING



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L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

ALTERNATE UHF-VHF TUNER SCHEMATIC

HOTPOINT MODELS 9510T, 9510Z ("T" Line)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	RF Amp.	6CB5	Note 1
V3	Mixer Osc.	6U8	
V5	1st Video IF Amp.	6CH8A	
V4	2nd Video IF Amp.	6CH8A	
V6	Video Output-Sync Sep.	12K7A	
V8	Sound IF Amp.	6AU6A	
V7	AF Amp.-Audio Output	10C8	
V8	Vert. Mult.-Vert. Output	10C8	
V9	Horiz. Mult.	7AU7	
V10	Horiz. Output	1BA5	
V11	Damper	17H3	
V12	HV Rectifier	1V3	

Note 1: Some versions may use 6BC5A in this application.

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	HOTPOINT PART No.	LBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V13	90P4		90P4	90P4	

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						
	CAP	VOLT	HOTPOINT PART No.	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	300	150	RCE-240	AFHS1-24-75	XA0263	FP319	TMS-27	S-415	TVL-1424
C2A	200	150	RCE-241	AFHS2-35-50		FP318	TMS-26	S-410	R2354*
B	20	300				VTX88	TD-80-350 ①	MTS-4530	
C3	4	50	RCE-236	PRS150V4	BBR4-50	TC30	TD-4-50	MMT-0505	TVA-1303

* Non catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP	VOLT	HOTPOINT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	150		RCW-2389							
C5	150		RCW-2389							
C6	5.6		RCW-2396	BPD-00008	DS-050	C10V5C		ST-505		
C7	100		RCW-2388		TCL-100					
C8	5-5		RCT-090		529-3		315-D	CT505A		N500
C9	1000			BPD-001	DD-102	BYA5GU	ED-1000	DC521	5HK-D1	①
C10	2.7			NPO-S1 2.2						
C11	4.0			NPO-S1 4	TCZ-1		TCO-1		97TCCB-V1	
C12	47		RCW-3145		TCL-47					NR500
C13	5		RCW-3148							N1500
C14	19		RCW-3299	NT90-S1 10	TCH-12	C10Q1U	TCT-12			N750
C15	8.8				TCZ-1					
C16	47		RCW-3297		TCL-47					N1500
C17	5-3		RCT-089		529-3		315-D	CT505A		
C18	1000			BPD-001	DD-102	BYA5GU	ED-1000	DC521	5HK-D1	①
C19	1000		RCW-3117	EF-001	MFT-1000				503C-D1	
C20	1000		RCW-3117	EF-001	MFT-1000				503C-D1	
C21	1000		RCW-3117	EF-001	MFT-1000				503C-D1	
C22	1000		RCW-3117	EF-001	MFT-1000				503C-D1	
C23	.000			BPD-001	DD-102	BYA5GU	ED-1000	DC521	5HK-D1	①
C24	.000		RCW-3117	EF-001	MFT-1000				503C-D1	
C25	75		RCW-3388	NT90-S1 75	TCZ-75	C10Q7SU	TCT-75	MT-5475	97TCC-Q75	N750
C26	1000			BPD-001	DD-103	BYA5DU	AD-1000	DC521	5HK-D1	
C27	680		RCW-3081							N330
C28	3.4		RCW-3387	NPO-S1 3.2	TCZ-3R2	C10V3SC				NPO
C29	8		RCW-3267	NPO-S1 8	TCZ-5	C10V5C	TCO-5	ST-555		NPO
C30	750		RCW-3211	BPD-0008	DH-751	LT6T7S	ED-750	UC-5375	5GA-T7S	
C31	.047	300	RCB-033			BC3S475		ACE5147	5SK-S47	
C32	5000		RCW-3014	BPD-005	DD-502	BYA10DS	ED-005	DC525	5HK-D5	
C33	8		RCW-3293			L10V8			5GA-V8	
C34	.1	600	RCB-036			BC8P1S		ACE-401	4SE-P10	
C35	3		RCW-3004	NPO-S1 3		C10V3C	TCO-3	ZT-553		
C36	30		RCW-3284	NPO-S1 30	TCZ-30	C10Q3C	TCO-30	ST-543	97TCC-Q2	NPO ②
C37	2200		RCW-3248	BPD-0022	DC-222	BYA10DS2	ED-0022	UC-5222	5HK-D22	NP0
C38	5600		RCW-3014	BPD-005	DD-502	BYA10DS	ED-005	DC525	5HK-D5	
C39	130		RCG-008		168-00012		ESH1713		5AB-N3	
C40	5000		RCW-3014	BPD-005	DD-502	BYA10DS	ED-005	DC525	5HK-D5	
C41	5000		RCW-3014	BPD-005	DD-502	BYA10DS	ED-005	DC525	5HK-D5	
C42	.1	200	RCB-017			BC3P-J		ACE-401	2SE-P10	
C43	330		RCW-3290	BPD-00033	DD-331	L10T33	ED-330	UC-5333	5GA-T33	
C44	.0047	400	RCB-028			BC8D47J		ACE-5247	4SE-D47	
C45	.022	200	RCB-044			BC8S22J		ACE-413	2SE-S15	
C46	.0039	600	RCB-021							
C47	.015	600	RCB-023			BC8S15J			6SE-S15	
C48	1300		RCW-3187	BPD-001	D6-132	L10D13	ED-1300	UC-5313	5GA-D13	
C49	1300		RCW-3187	BPD-001	D6-133	L10D13	ED-1300	UC-5313	5GA-D13	
C50	5000		RCW-3274	BPD-005	DD-502	BYA10DS	ED-005	DC525	5HK-D5	
C51	.1	300	RCB-037			BC3P-J		ACE401	2SE-P10	
C52	330		RCU-348	1484-0008R		UR7TH			M3-381	
C53	.0047	400	RCB-028			BC8D47J		ACE5247	4SE-D47	
C54	10000		RCW-3188	BPD-01	DD-103	BYA5GU	ED-01	DC521	5HK-S1	
C55	680		RCW-3280			BC8S68J				
C56	470		RCW-3219	BPD-00047	DH-471	BYA10T47U	ED-470	UC-5347	5GA-T47	
C57	1000	10000	RCW-3181 ①							
C58	240	3000	RCW-3259							N1500
C59	500		RCW-3037	BPD-0008	DD-801	L10T8	ED-0008		5GA-T8	
C60	800		RCW-3037	BPD-0008	DD-801	L10T8	ED-0008		5GA-T8	
C61	10000		RCW-3188	BPD-01	DD-103	BYA5SI	ED-01	DC521	5HK-S1	

① Some versions use 8000MF in this application. (Part #RCW-3037)
② Not used in some versions.

CONTROLS

ITEM No	RATING		REPLACEMENT DATA						INSTALLATION NOTES
	RESISTANCE	WATTS	HOTPOINT PART No	CENTRALAB PART No	CLAROSTAT PART No	IRC PART No	MALLORY PART No		
R1A	500K		RRC-399						Volume
B	Switch								
R2	25K		RRC-397						Contrast
R3	1.5Meg		RRC-402						Vertical Hold
R4	200K		RRC-398						Brightness
R5A	1Meg		RRC-400						Height
B	500K								Vert. Lin.
R6	1Meg		RRC-401						Horiz. Hold

PARTS LIST AND DESCRIPTIONS

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	HOTPOINT PART No	IRC PART No.	
R7	3.3Meg			BTS 3.3Meg	
R8	3.3Meg			BTS-3.3Meg	
R9	470Ω			BTS 470	
R10	330Ω			BTS 330	
R11	330Ω			BTS 330	
R12	10K			BTS-10K	
R13	2200Ω			BTS-2200	Note 1
R14	15K			BTS-15K	
R15	150K			BTS-150K	
R16	15K			BTS-15K	
R17	4700Ω			BTS-4700	
R18	1000Ω			BTS-1000	
R19	15K	2		BTB-15K	
R20	10K			BTS-10K	
R21	3300Ω				
R22	470Ω			BTS-470	
R23	56Ω			BTS-56	
R24	2.2Meg				
R25	33K				Note 3
R26	470Ω			BTS-470	
R27	56Ω			BTS-56	
R28	22Meg			BTS-22Meg	
R29	220K 5%			BTS-220K 5%	
R30	3300Ω			BTS-3300	
R31	220K			BTS-220K	
R32	22K			BTS-22K	
R33	3300Ω	2		BTB-3300	
R34	10K			BTS-10K	
R35	100K			BTS-100K	
R36	330K			BTS-330K	

Note 1: Early versions use a 10K resistor.
Note 2. Later versions use a 5.6Meg resistor.
Note 3: A 1Meg resistor is used in some versions.

ITEM No	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	HOTPOINT PART No	IRC PART No.	
R37	470Ω			BTS-470	
R38	180Ω			BTS-180	
R39	22K			BTS-22K	
R40	220Ω			BTS-220	
R41	6.8Meg			BTS-6.8Meg	Note 2
R42	1Meg			BTS-1Meg	
R43	82K			BTS-82K	
R44	68K			BTS-68K	
R45	2200Ω				
R46	2200Ω				
R47	680K				
R48	560K				
R49	1Meg				
R50	82K 5%				
R51	150K 5%				
R52	4.7Meg 5%				
R53	13K 5%				
R54	820K				
R55	100K				
R56	75K 5%				
R57	270K 5%				
R58	1300Ω 5%				
R59	12K				
R60	82K 5%			BTS-82K 5%	
R61	820K			BTS-820K	
R62	330Ω			BTS-330	
R63	680K	1		BTA-680K	
R64	.5Ω		RRW-155	BW1-.5	
R65	3Ω	5	RRW-137	PW7-3	

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							
		HOTPOINT PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	Horiz. Output Trans.	RTO-196							
T2	Vert. Output Trans.	RTO-199	Z1804 ①	A-3037 ①	222T1 ①	V313 ①	A-8123 ②	28S72 ①	A-102X ①
T3A	Yoke(T3-Horiz(33MH)	RLD-975		MDF-4T3 ①				T-33 ③ ④	
B	Vert(40MH)	RHH-013 ②		③					
		RMC-058 ③							

① Drill new mounting hole(s).
② Yoke retaining ring.
③ Yoke clamp.
④ Connect jumper from yoke term #1 to yoke term #3.
⑤ Use original yoke retaining ring and yoke clamp.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	HOTPOINT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T4	7000Ω	3-4Ω	RTO-197	Z1113 ①	A-3998	A-3310	24849	S-7X	① Drill one new mtg. hole,

SPEAKER

ITEM No	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	HOTPOINT PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	ROP-035	4A07	

COILS (RF-IF)

ITEM No.	USE	HOTPOINT PART No.	NOTES
L1	Ant. Trans.	RLA-047	
L3	Ant. Coils	RSX-684	Includes stator ass'y. complete with rotor.
L3	RF Coils	RSX-693	Includes stator ass'y. complete with rotor.

ITEM No.	USE	REPLACEMENT DATA				NOTES
		HOTPOINT PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L7	1st Video IF	RLI-361				
L8	2nd Video IF	RTL-186				
L9	Series Peaking Coil	RLI-207	19-3100	TV-181	6113	100 Microhenries
L10	Series Peaking Coil	RLI-205	19-3125		6178	120 Microhenries
L11	Shunt Peaking Coil	RLI-194	19-3300	TV-180	6133	330 Microhenries
L12	1st Sound IF	RLI-194				Includes C36. Note 1
L13	Line Choke	RLI-325				33 Microhenries

Note 1: Some versions use part #RLI-408 and delete C-36.

ITEM No.	USE	HOTPOINT PART No.	NOTES
L4	Mixer Grid Coils	RSX-683	Includes stator ass'y. complete with rotor.
L5	Osc. Coils	RSX-681	Includes stator ass'y. complete with rotor.
L6	Conv. Plate Coil	RLI-402	

TRANSFORMER (HORIZ., OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA							NOTES
	PRI.	SEC.	HOTPOINT PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	
L14	75Ω		RLI-380							

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE @ CURRENT (1000 ^\)	HOTPOINT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L15	.200A	25Ω	.8HY	RLF-076	C3040	C-3994	C-3327	23C41	C-34X

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	HOTPOINT PART No.	REPLACEMENT DATA
K1	Chassis Isolation	4700MMF, 1Meg	RCR-005*	
K2	Audio De-emphasis	1000MMF, 6000MMF, 10000MMF, 22K	REK-014	Aerovox PA-425 Centralab PC-186 Sprague PB-3
K3	Audio	680MMF 10000MMF, 6.8Meg 1Meg, 470K	REK-017	Aerovox PA-515
K4	Vert. Int.	820MMF, 820MMF, 180MMF, 130MMF, 68K, 120K, 47K, 47K	REK-018	
K5	Horiz. -Sync	470MMF, 5000MMF, 10000MMF 470K, 2.2Meg	REK-015	Aerovox PA-525

* Early production used individual units of 1Meg and 5000MMF in this application.

RECTIFIERS

ITEM No	RATING	REPLACEMENT DATA						
	CURRENT (Measured)	HOTPOINT PART No	FEDERAL PART No	GENERAL ELECTRIC PART No	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No	SARKES TARZIAN PART No.
M1	.200A	RRH-025 ①	1090A 1	1N100T ②	RS3009L D	65300 L	624 1	300 1
M3		RRH-023 1	1215 1 ③		IT1 1 ③			

① Selenium type.
② Germanium type.
③ required.

FUSES

ITEM No	TYPE	RATING	REPLACEMENT DATA					
			HOTPOINT PART No		LITTELFUSE PART No		BUSS PART No	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3	N	1 1/4A 125V S/B	RFF-029	RFW-008*	312L 25 (N-1 1/4A)	340111	M 1 1/4	HM 3/4 to 1 1/4

* Includes clip.

CRYSTAL DIODES

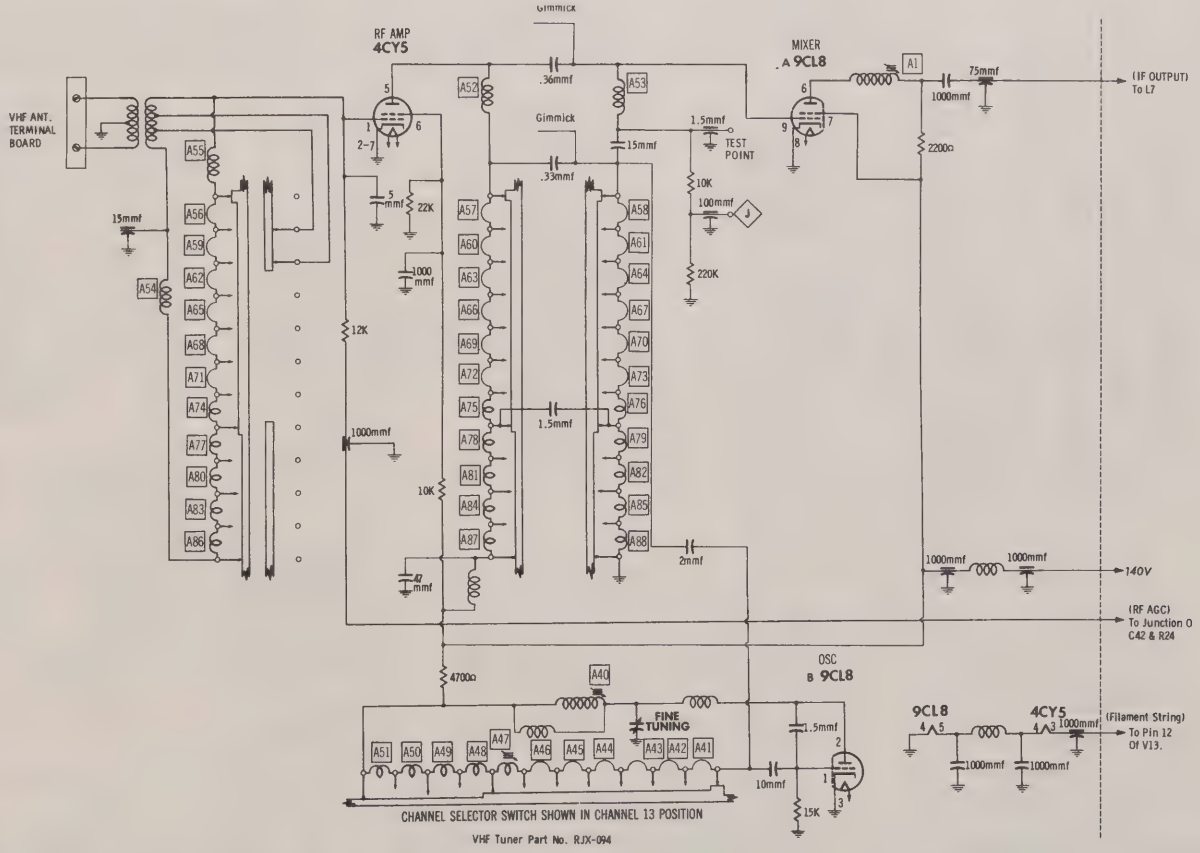
ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		HOTPOINT PART No.	SYLVANIA PART No.	
M4	1N87G*	RED-001	1N60	Video Detector (Pigtail)
M5	1N87G	RED-001	1N60	Ratio Detector (Pigtail)
M6	1N87G	RED-001	1N60	Ratio Detector (Pigtail)

* A 1N64 may be used in some versions.

MISCELLANEOUS

ITEM No.	PART NAME	HOTPOINT PART No.	NOTES
M7	Tuner	RJX-064	VHF. 13 Position.
	Tuner	RJX-094	VHF.
	Tuner	RJX-085	VHF. 13 Position.
	Tuner	RUX-018	UHF
M8	Crystal Det. Ass'y.	RLI-393	Includes 3rd Video IF, Shunt Peaking Coil and Two Series Peaking Coils.
M9	Crystal Det. Ass'y.	RTD-037	Includes Ratio Det. and Resistors.
M10	Switch		Local-Distance, Slide Type (DPDT). Note: Not used in some versions.
M11	Centering Device	REA-014	
M12	Ion Trap	RET-015	
	Yoke Clamp	RMC-058	
	Printed Board	REU-002	Ant. Terminal Ass'y.
	Safety Glass	RDW-123	
	Handle	REH-086	
	Knob	HDK-001	3 Used
	Knob	HDK-008	VHF Channel Selector
	Knob	HDK-009	Fine Tuning
	Knob	HDK-010	UHF Indicator
	Knob	HDB-001	Button, Insert for UHF window.
	Cabinet Front	HAC-001	Model 9810.
	Cabinet Front	HAC-008	Model 9802.
	Cabinet Body	HAV-015	Model 9810. Includes Back.
	Cabinet Body	HAV-016	Model 9802. Includes Back.

HOTPOINT MODELS 9S101, 9S102 ("T" Line)



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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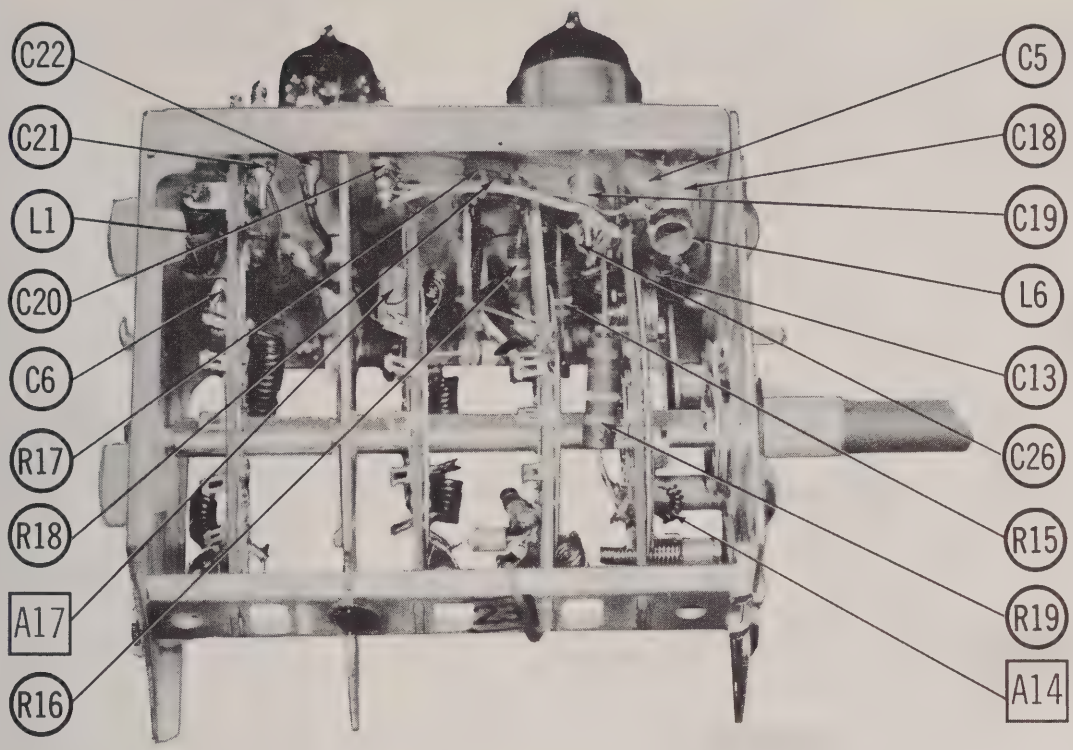
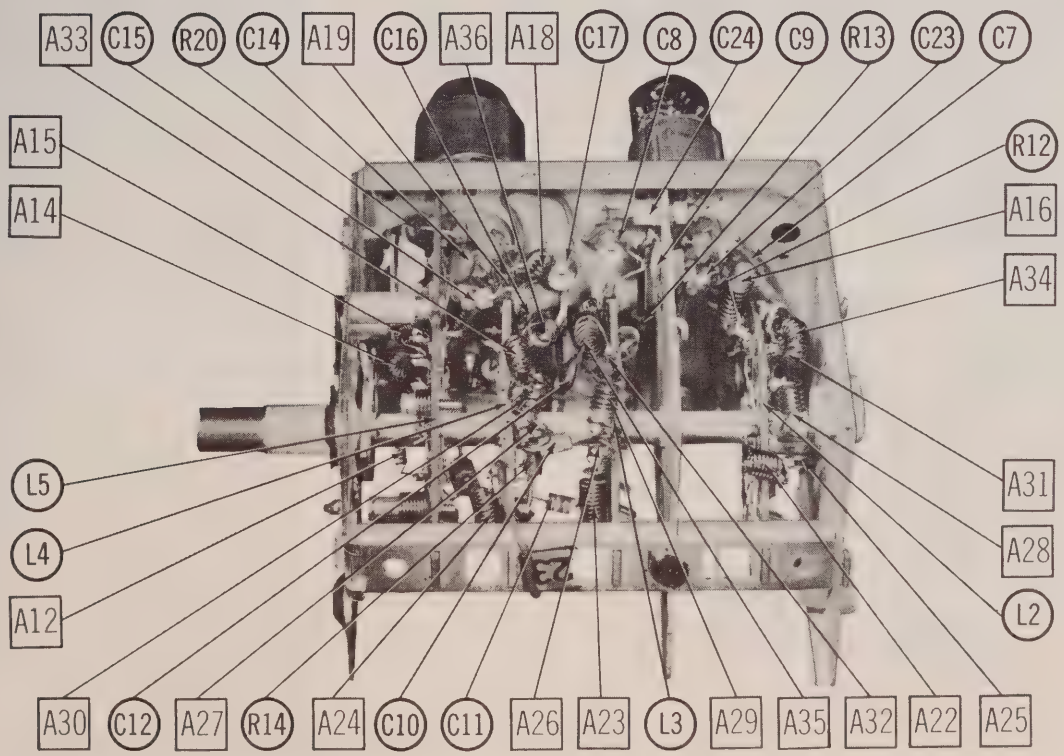
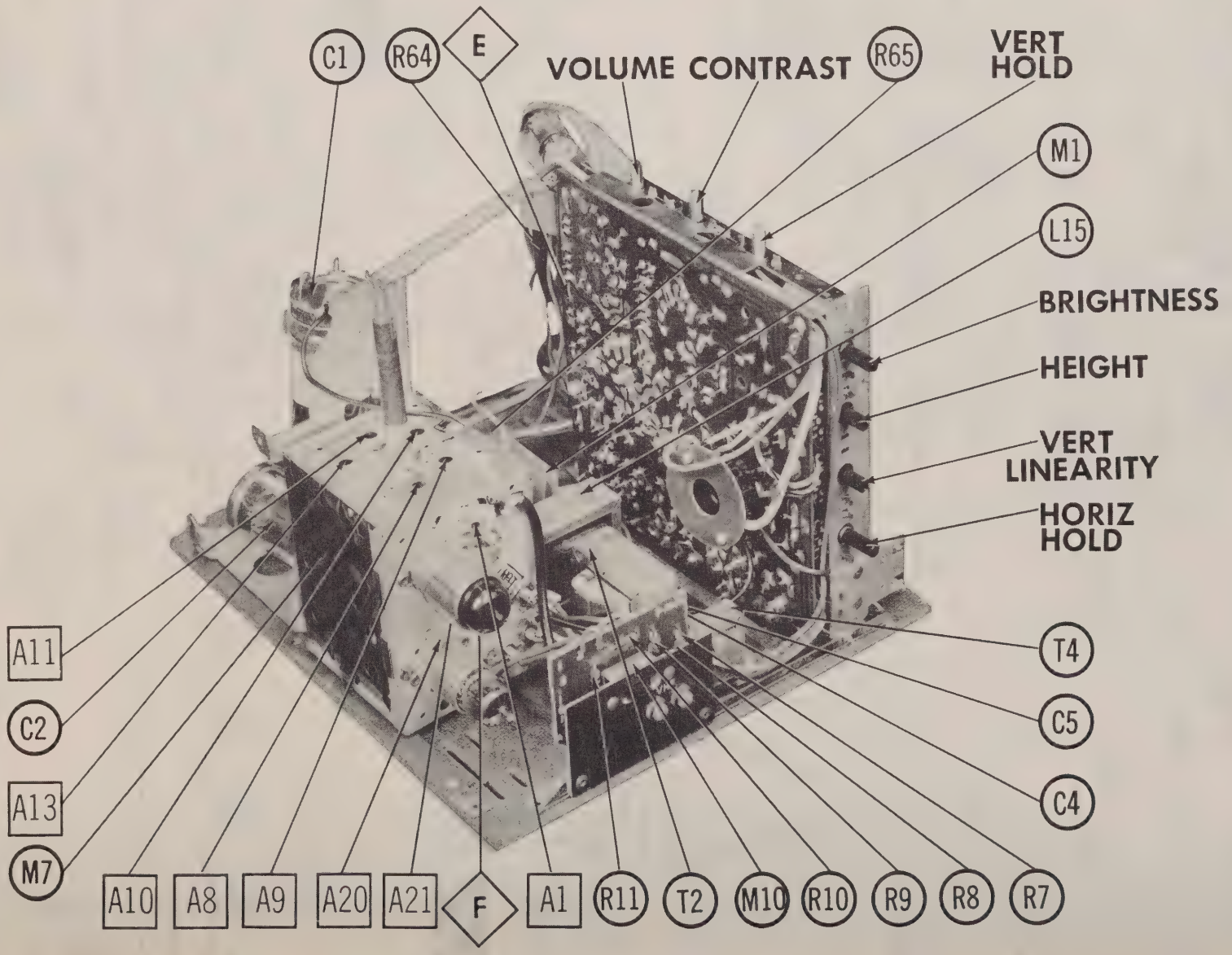
ALTERNATE VHF TUNER SCHEMATIC



RF TUNER-LEFT SIDE



RF TUNER-RIGHT SIDE



CHASSIS ASSEMBLED VIEW

MAGNAVOX CHASSIS CR734AA

MAGNAVOX CHASSIS CR734AA

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

MAGNAVOX CHASSIS CR734AA

TRADE NAME	Magnavox Chassis CR-734AA
MANUFACTURER	Magnavox Co., 2131 Bueter Rd., Fort Wayne 4, Indiana
TYPE SET	AC Operated AM Receiver With 3 Speed Manual Record Player
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det. -AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING .28 Amp. @ 117 Volts AC (27 Watts)
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ Mod)	Point of non-interference	Across voice coil	A1, A2, A3	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2		Loop	1650KC	Tuning gang fully open	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	Tune to 1400KC signal	"	A5	"

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PARTS LIST AND DESCRIPTIONS

MAGNAVOX
CHASSIS CR-734AA

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amp.	12AV6	

ITEM No.	USE	TYPE	NOTES
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	270557-1	PRS150V40	BBRT44215	TCT3116	TDLT-4	FMT-312	R1110 *
B	40	150		4020				FM-1510	
C	20	150							

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	200			SI 200	D6-201	LT6T2	GP-200	UC-532	5GA-T2	
C3	.05	200	250753-1	BPD-05	DF-503	CUB2S5		GEM-415	4TM-S5	
C4	.1	400	250211-13	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C5	10		250207-3	SI 10	D6-100	LT6Q1	GP-10	UC-541	5GA-Q1	
C6	.047	400	250211-11	BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C7	10000		250175-33	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C8	5000		250175-1	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C9	3300		250174-41	BPD-0033	DD-332	BYA10D33	ED-0033	UC-5233	5GA-D33	
C10	.047	400	250211-11	BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	220602-1	BT-65	A47F3-500K	Q19-133X	UT-431	Volume, Tap @ 200K
B	Shaft			Not req.	FS-3	Not req.	Not req.	
C	Switch			KB-1	SWE-12	76-1	US-26	
R2	1Meg	½	220659-2					Tone & Switch

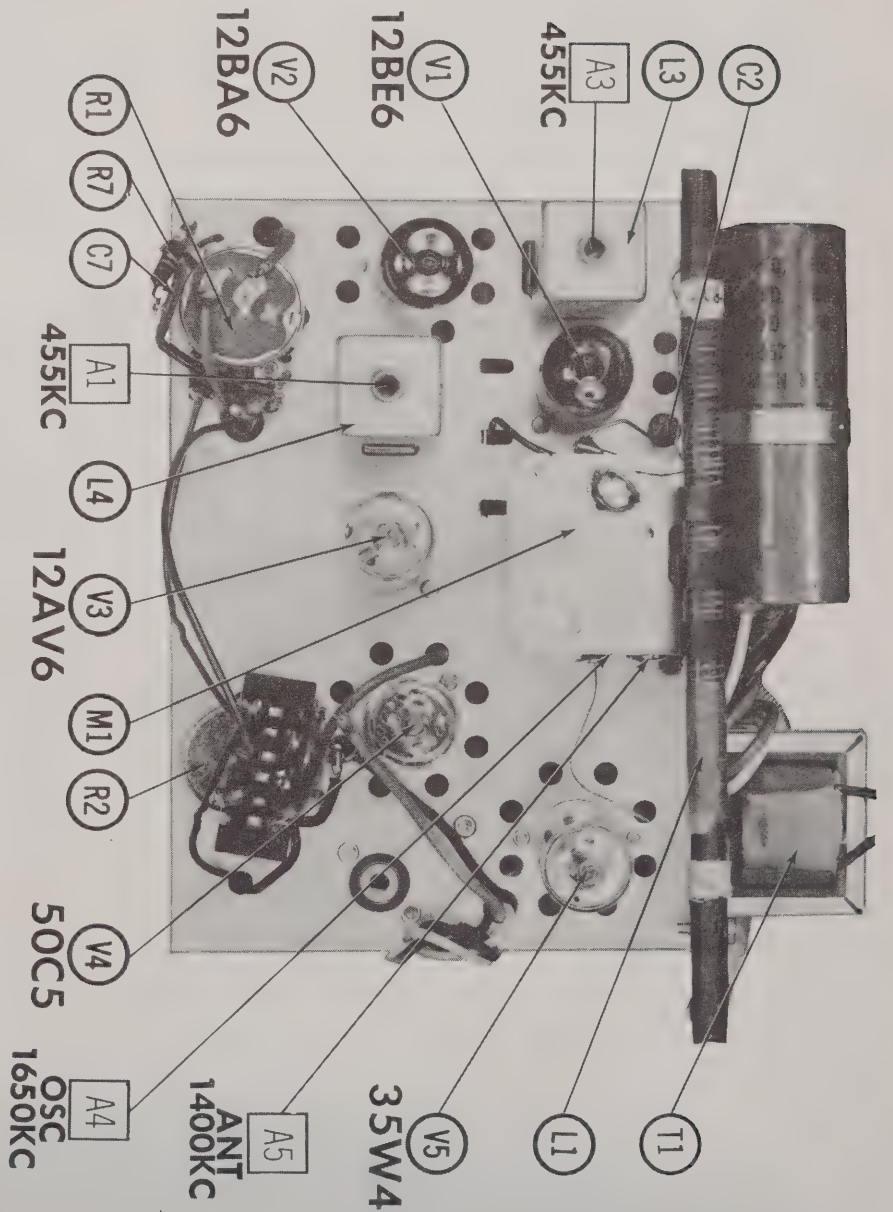
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MAGNAVOX PART No.	IRC PART No.	
R3	1Meg		230094-31	BTS-1Meg	
R4	68Ω		230104-48	BTS-68	
R5	3.3Meg		230094-34	BTS-3.3Meg	
R6	2.2Meg		230094-33	BTS-2.2Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MAGNAVOX PART No.	IRC PART No.	
R7	27K		230104-79	BTS-27K	
R8	1200Ω	1	230105-63	BTA-1200	
R9	220Ω	1	230105-54	BTA-220	
R10	150Ω		230104-52	BTS-150	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3000Ω	3-4Ω	320807-2	Z1101	A-3025	A-3332	22S46 ①	S-12X	① Drill new mounting hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MAGNAVOX PART No.	QUAM PART No.	
SP1	8"	PM	3-4Ω	583688-1	8A21	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		MAGNAVOX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Stick	461509-1				
L2	Osc. Coil	361217-1				
L3	Input IF	361215-1	16-6758	BC-352	12-C1	
L4	Output IF	361216-1	16-6758	BC-353	12-C2	

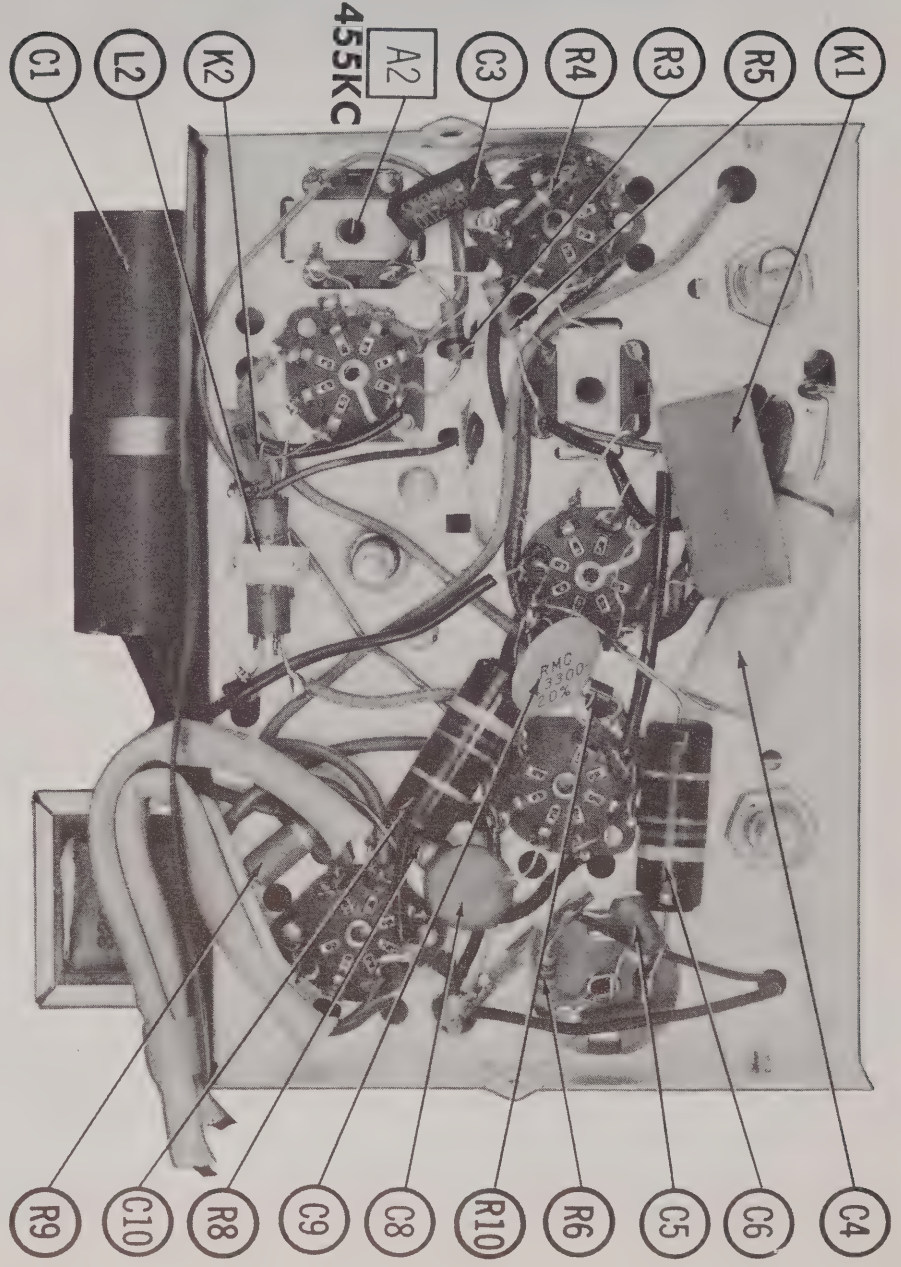
COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MAGNAVOX PART No.	REPLACEMENT DATA
K1	Det. -Audio Net.	5000MMF, 250MMF, 250MMF, 5000MMF, 470K, 470K, 6.8Meg	250754-1	Aerovox PA-113-2 Centralab PC-151 Cornell-Dubilier 116TM2 Erie 1408-02 Sprague DT-2
K2	Osc. Grid Plate	30MMF, 22K	250186-5	

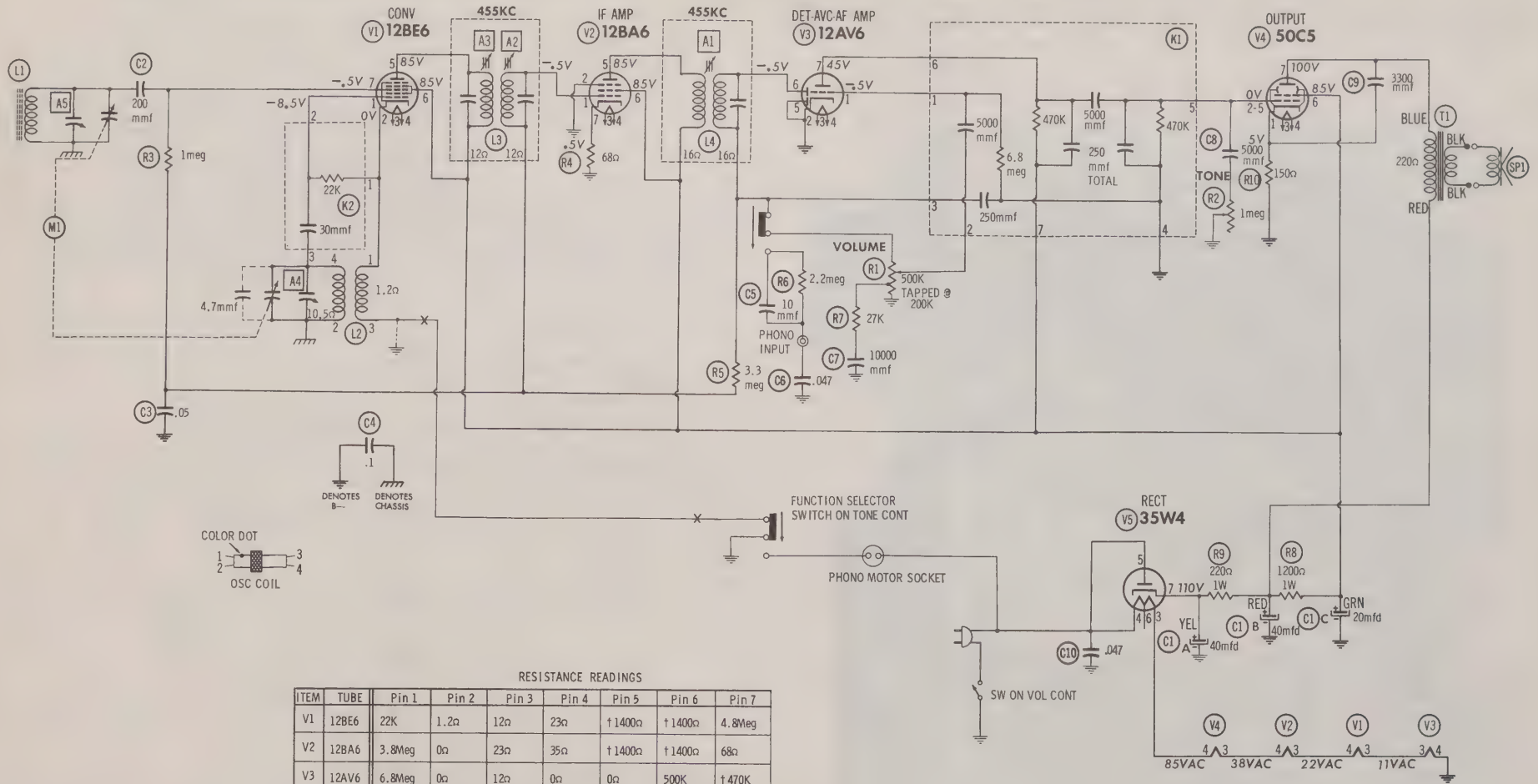
MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M1	Tuning gang	260603-1	2 Gang (13-235MMF, 14-101MMF)
	Knob	140770-1	Control (Turquoise Cabinet)
	Knob	140770-2	Control (Coral Cabinet)
	Knob	140770-3	Control (Grey, Tan & Green Cabinet)
	Knob	140770-4	Tuning (Turquoise Cabinet)
	Knob	140770-5	Tuning (Coral Cabinet)
	Knob	140770-6	Tuning (Grey, Tan & Green Cabinet)

CHASSIS—BOTTOM VIEW



MAGNAVOX CHASSIS CR-734AA



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	1.2Ω	12Ω	23Ω	†1400Ω	†1400Ω	4.8Meg
V2	12BA6	3.8Meg	0Ω	23Ω	35Ω	†1400Ω	†1400Ω	68Ω
V3	12AV6	6.8Meg	0Ω	12Ω	0Ω	0Ω	500K	†470K
V4	50C5	150Ω	470K	35Ω	84Ω	470K	†1400Ω	†440Ω
V5	35W4	TP	TP	84Ω	117Ω	117Ω	110Ω	20K(Min)

† MEASURED FROM PIN 7 OF V5
TP TIE POINT
NC NO CONNECTION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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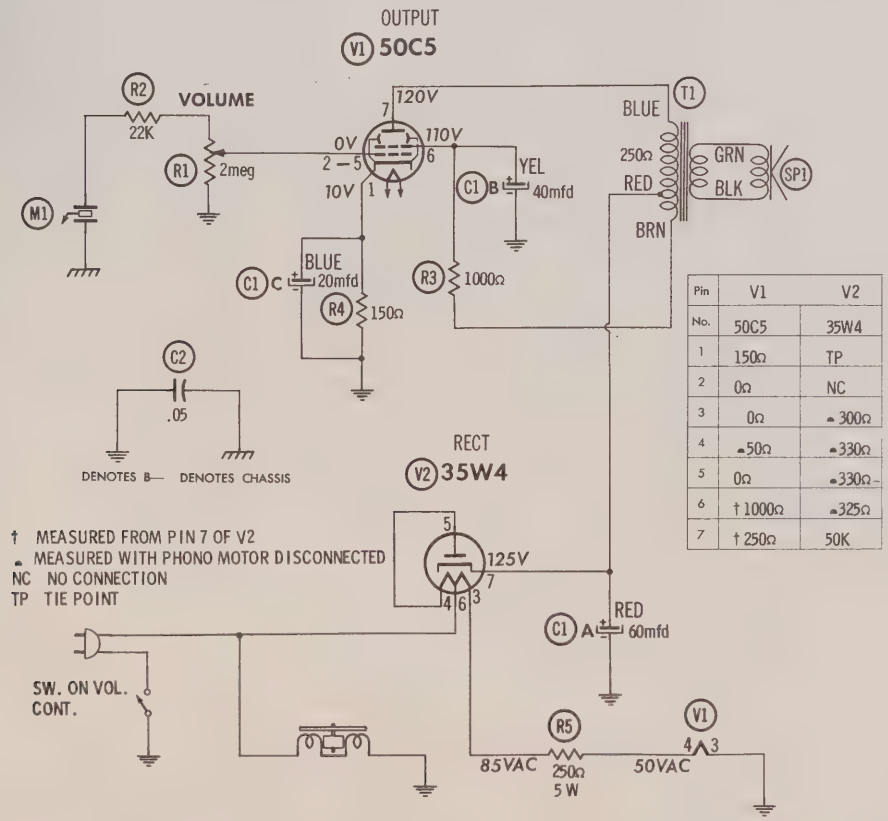
METEOR
MODEL 7232 (Ch. 567.36007)

METEOR
MODEL 7232 (Ch. 567.36007)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

METEOR
MODEL 7232 (Ch. 567.36007)

TRADE NAME	Meteor Model 7232 (Ch. 567.36007)
SUPPLIER	Sears Roebuck & Co., 925 S. Homan, Chicago, Ill.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Manual Record Player
TUBES (Two)	Types 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-60 Cycles RATING .25 Amp. @ 117 Volts AC



Pin No.	V1 50C5	V2 35W4
1	150Ω	TP
2	0Ω	NC
3	0Ω	▲300Ω
4	▲50Ω	▲330Ω
5	0Ω	▲330Ω
6	† 1000Ω	▲325Ω
7	† 250Ω	50K

† MEASURED FROM PIN 7 OF V2
▲ MEASURED WITH PHONO MOTOR DISCONNECTED
NC NO CONNECTION
TP TIE POINT

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Output	50C5	

ITEM No.	USE	TYPE	NOTES
V2	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	METEOR PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A B C	60 40 20	150 150 20	770157	PRS150/25V 8040/20	BBRT8415C	TCT3117	TDLT-18	FMT-333	TVA-3436

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	METEOR PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	05	200	770122	BPD-05	DF-503	CUB2S5		GEM-415	2TM-S5	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	METEOR PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	2Meg	½	740063					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	METEOR PART No.	IRC PART No.	
R2	22K		760005	BTS-22K	
R3	1000Ω		760067	BTS-1000	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	METEOR PART No.	IRC PART No.	
R4	150Ω		760023	BTS-150	
R5	250Ω	5	760309	PW7-250	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	METEOR PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2400Ω	3-4Ω	700044	Z1102 ①	A-3031 ①	A-3336 ①	24S50A ①	S-16X ①	① Drill new mounting hole.

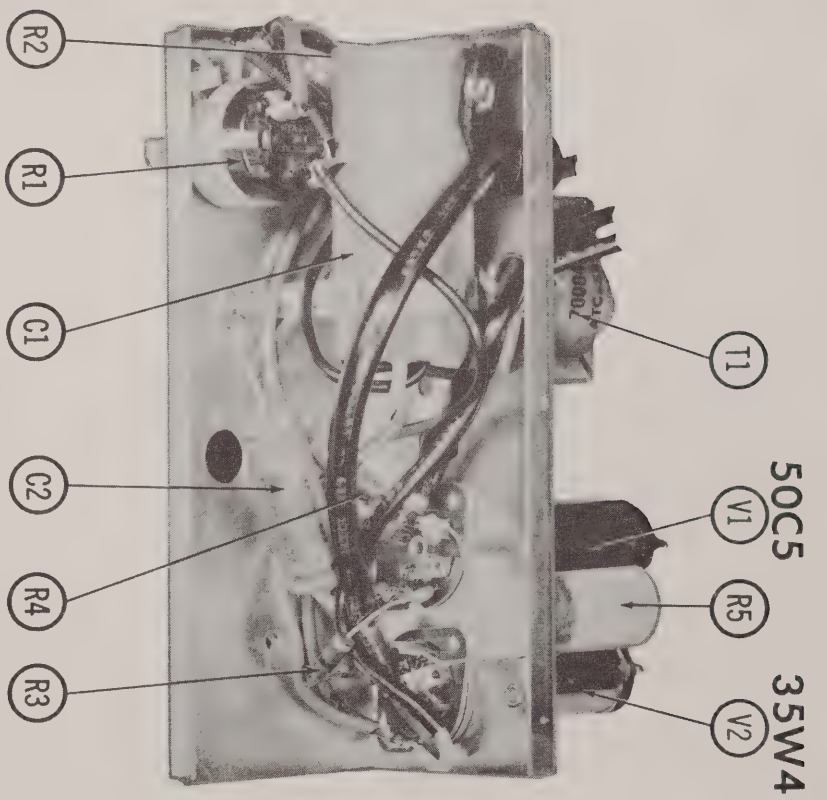
SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	METEOR PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	011870	4A07	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	METEOR PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	MOUNT	
M1	720059	16 † P-29	N4-2	*† 2460		* Use high-output level connection. † Complete tone arm and cartridge assembly.

CHASSIS—BOTTOM VIEW



PHONO NEEDLE

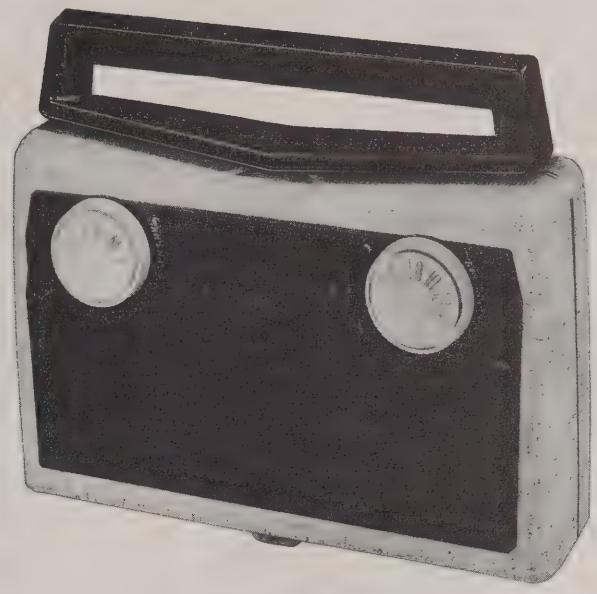
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	METEOR PART No.	JENSEN PART No.	WALCO PART No.	
M2	5712	* J-152 or † NY-252 or ♦ J-252D	* WA400-2 or † WS400-2 or ♦ W-400AGD	* Metal † Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	METEOR PART No.	NOTES
	Cabinet Knob	440305 310246	Includes Lid On-Off Volume

MOTOROLA MODELS 5P31A, 5P32C, E, R, Y, 5P33EW, VW, W (Ch. HS-559, HS-561)



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

MOTOROLA MODELS 5P31A, 5P32C, E, R, Y, 5P33EW, VW, W (Ch. HS-559, HS-561)

TRADE NAME	Motorola Models 5P31A, 5P32C, E, R, Y (Ch. HS-559), 5P33EW, VW, W (Ch. HS-561)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Ill.
TYPE SET	Three Power Portable AM Receiver
TUBES (Four)	Types 1R5 Converter, 1U4 IF Amplifier, 1DN5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY	110-120 Volts AC-DC (OR) 7.5 Volts DC "A" Supply & 90 Volts DC "B" Supply
RATING	.15 Amp. @ 117 Volts AC (OR) 56MA @ 7.5 Volts DC & 5MA @ 90 Volts DC (10 Watts)
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in the same relative position to chassis as when the receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
	During alignment, connect a clip lead from volume control bracket to speaker frame to complete audio circuit.						
1	.1MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to chassis.	455KC (400~ Mod)	Tuning gang fully open	Across voice coil	A1, A2 A3	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2	"	"	1620 KC	"	"	A4	"
3		Loop	1400KC	Tune to 1400KC signal	"	A5	(Perform this adjustment with chassis in cabinet) Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
	The following steps are not necessary unless oscillator core has been tampered with or replacement of associated components has been made.						
4	.1MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to chassis.	1620 KC	Tuning gang fully open	Across voice coil	A4	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
5	"	"	535KC	Tuning gang fully closed	"	A6	" Repeat steps 4 & 5 making step 4 the last adjustment.
6		Loop	1400KC	Tune to 1400KC signal	"	A5	(Perform this adjustment with chassis in cabinet) Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
7		"	600KC	Tune to 600KC signal	"	A7	" Repeat steps 6 & 7 making step 6 the last adjustment.

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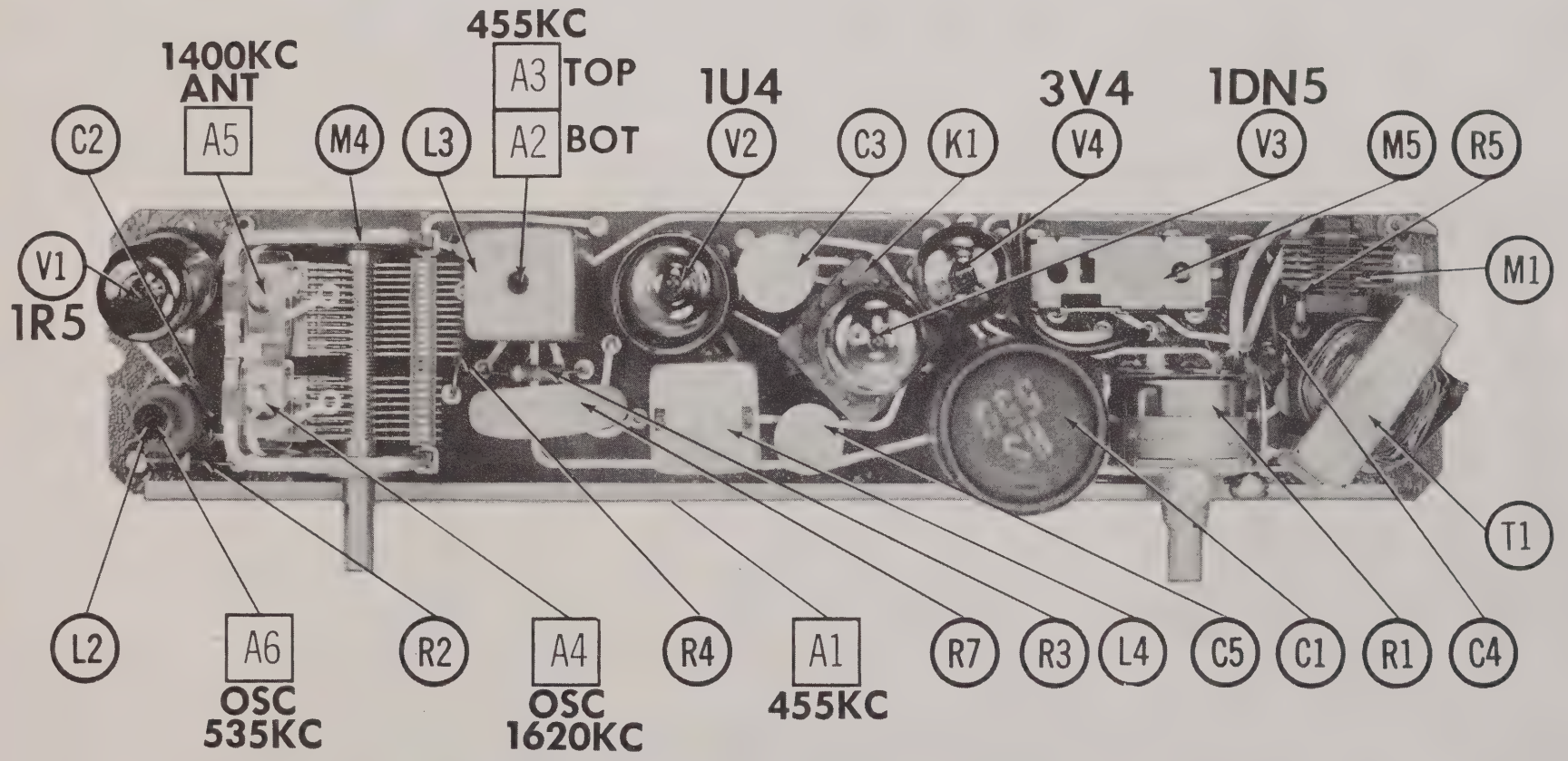


CHASSIS-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	1R5	
V2	IF Amplifier	1U4	
V3	Det. -AVC-AF Amp.	1DN5	
V4	Output	3V4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■80	150	23B636161						R2430 *
B	▲60	150							
C	400	10							

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	10000		21B533471	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C3	.25	100	8K122249			BC2P22J		ACE6022	2SE-P22	
C4	2000		21K633268	BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C5	.02	400	8K122301	BPD-02	DD-203	BC6S22J	ED-02	ACE612	4SE-S22	
C6	.05	600	8K125139	BPD-05	DF-503	CUB6S5		GEM-615	6TM-S5	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	1Meg	½	18K637190					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA MOTOROLA PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R2	100K		6R6075	BTS-100K	
R3	47K		6R6056	BTS-47K	
R4	680Ω		6R6040	BTS-680	
R5	820Ω		6R6269	BTS-820	
R6	150Ω		65A633275		Note 1
R7	2000Ω 5%	6	17B633148		

Note 1. Special fuse type resistor.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	9800Ω	3-4Ω	25B637155		A-2998①	A-3329①	24S49 ①	S-11X ①	① Bend ears down and use original terminal board.

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA MOTOROLA PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	50C637021①	4A07	① Alternate Part #50K637022

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Loop Stick	1V637829				(Includes handle) Model 5P31A
	Loop Stick	1V637828				(Includes handle) 5P32, 5P33 series
L2	Osc. Coil	24B637270				
L3	Input IF	24D637271	16-6780	BC-356	13-PC1	
L4	Output IF	24K637272				

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MOTOROLA PART No.	REPLACEMENT DATA
K1	Det. -AVC-Audio Module	1000MMF, 120MMF, 10000MMF 2000MMF, 120MMF, 47000MMF 3. 3Meg, 1Meg, 3. 3Meg, 3. 3Meg 270Ω, 680Ω, 6. 8Meg	51C637185	

SELENIUM RECTIFIER

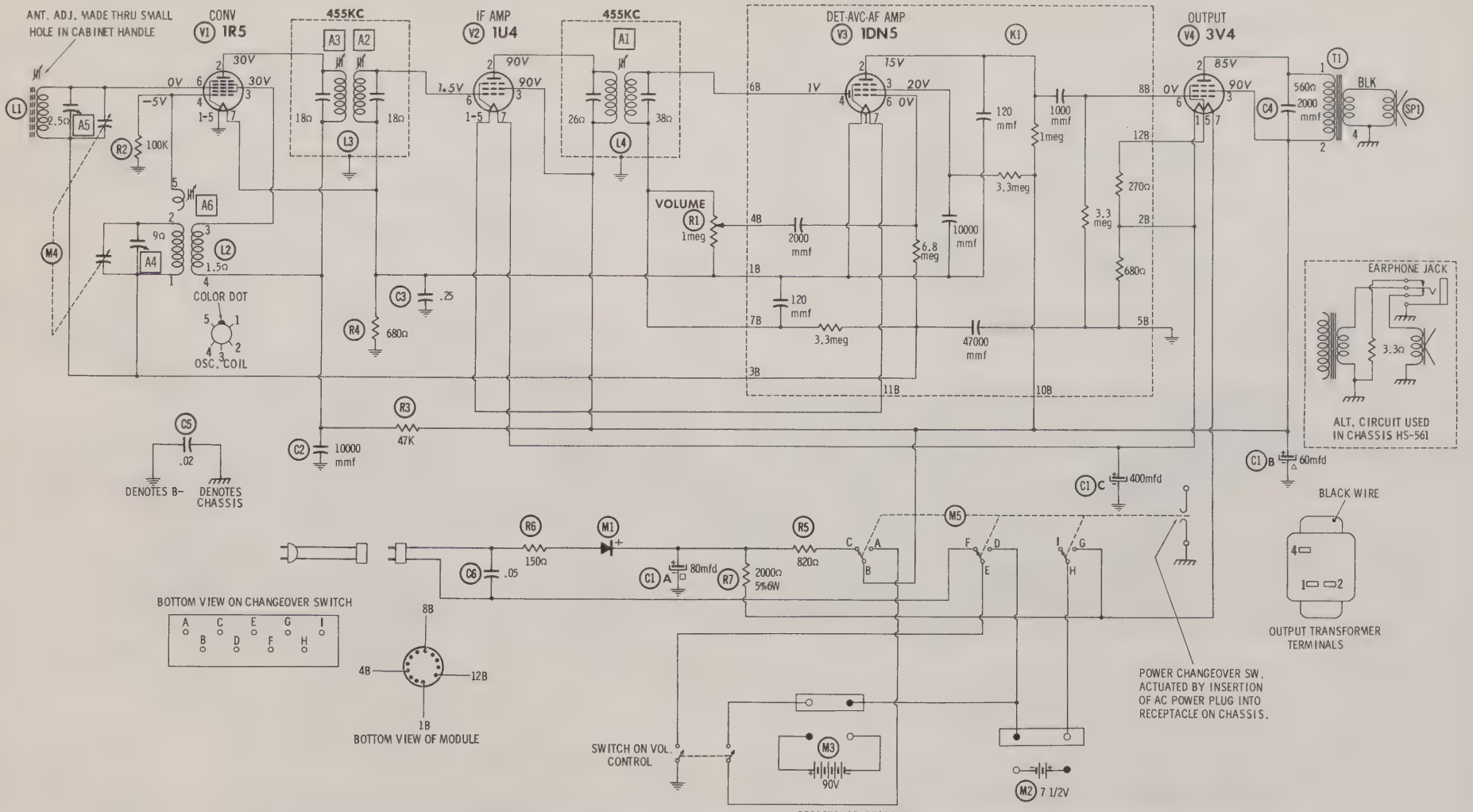
ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA MOTOROLA PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	NOTES
M1	.058A	48K631295	1386	RS065	6S65	65	

BATTERIES

ITEM No.	VOLTAGE	MOTOROLA PART No.	REPLACEMENT DATA BURGESS "A"	BURGESS "B"	EVEREADY "A"	EVEREADY "B"	MALLORY "A"	MALLORY "B"	RAY-O-VAC "A"	RAY-O-VAC "B"	NOTES
M2	7½V		D5		707						
M3	90V			P60		479		M-214		214	

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M4	Tuning gang	19K637013	Two gang (5P31, 5P32 series)
	Tuning gang	19B637012	Two gang (5P33 series)
M5	Switch	40B635263	Power change over (slide type)
	Knob	36C637017	Tuning - gray (5P31 series)
	Knob	36C637014	Tuning - clear & gold (5P32 series)
	Knob	36C637011	Tuning - clear (5P33 series)
	Knob	36K637018	Volume - gray (5P31 series)
	Knob	36K637016	Volume - clear & gold (5P32 series)
	Knob	36C637015	Volume -clear & gold (5P33 series)
	Cabinet	1V637347	Gray (5P31A)
	Cabinet	1V637359	Light Blue (5P32C)
	Cabinet	1V637356	Navy Blue (5P32E)
	Cabinet	1V637357	Red (5P32R)
	Cabinet	1V637358	Yellow (5P32Y)
	Cabinet	1V637386	Navy Blue & White (5P33EW)
	Cabinet	1V637387	Lavender & White (5P33VW)
	Cabinet	1V637388	White (5P33W)
	Handle Ass'y.	1V637829	Maroon (5P31A) Includes L1
	Handle Ass'y.	1V637828	Charcoal Black (5P32 & 5P33 series) Includes L1



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	1R5	0Ω	†47K	†47K	100K	0Ω	4.3Meg	•
V2	1U4	•	†850Ω	†820Ω	NC	•	20Ω	•
V3	1DN5	•	†1Meg	†3.3Meg	1Meg	NC	11Meg	•
V4	3V4	•	†1400Ω	†820Ω	NC	•	3.3Meg	•

ALL MEASUREMENTS TAKEN IN AC-DC POSITION
* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE
† MEASURED FROM OUTPUT OF M1
NC NO CONNECTION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

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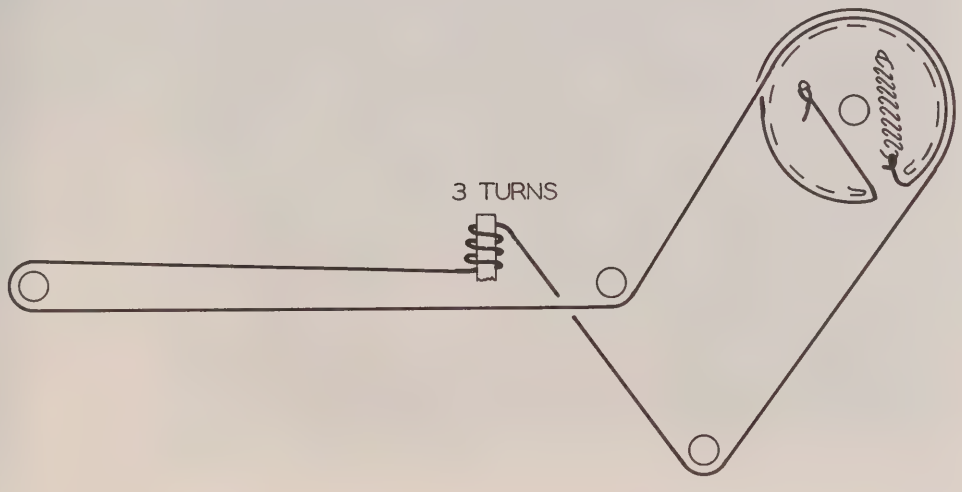
RETMA MEMBER

NEWCOMB
MODEL CO-712

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

NEWCOMB
MODEL CO-712

TRADE NAME	Newcomb Model CO-712		
MANUFACTURER	Newcomb Audio Prod. Co., 6824 Lexington Ave., Hollywood 38, California		
TYPE SET	AC Operated FM-AM Receiver		
TUBES	Twelve		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING	.8 Amp. @ 117 Volts AC (85 Watts)
TUNING RANGE - BROADCAST	535KC - 1630KC	FREQ. MOD.	88MC - 108MC



DIAL CORD STRINGING

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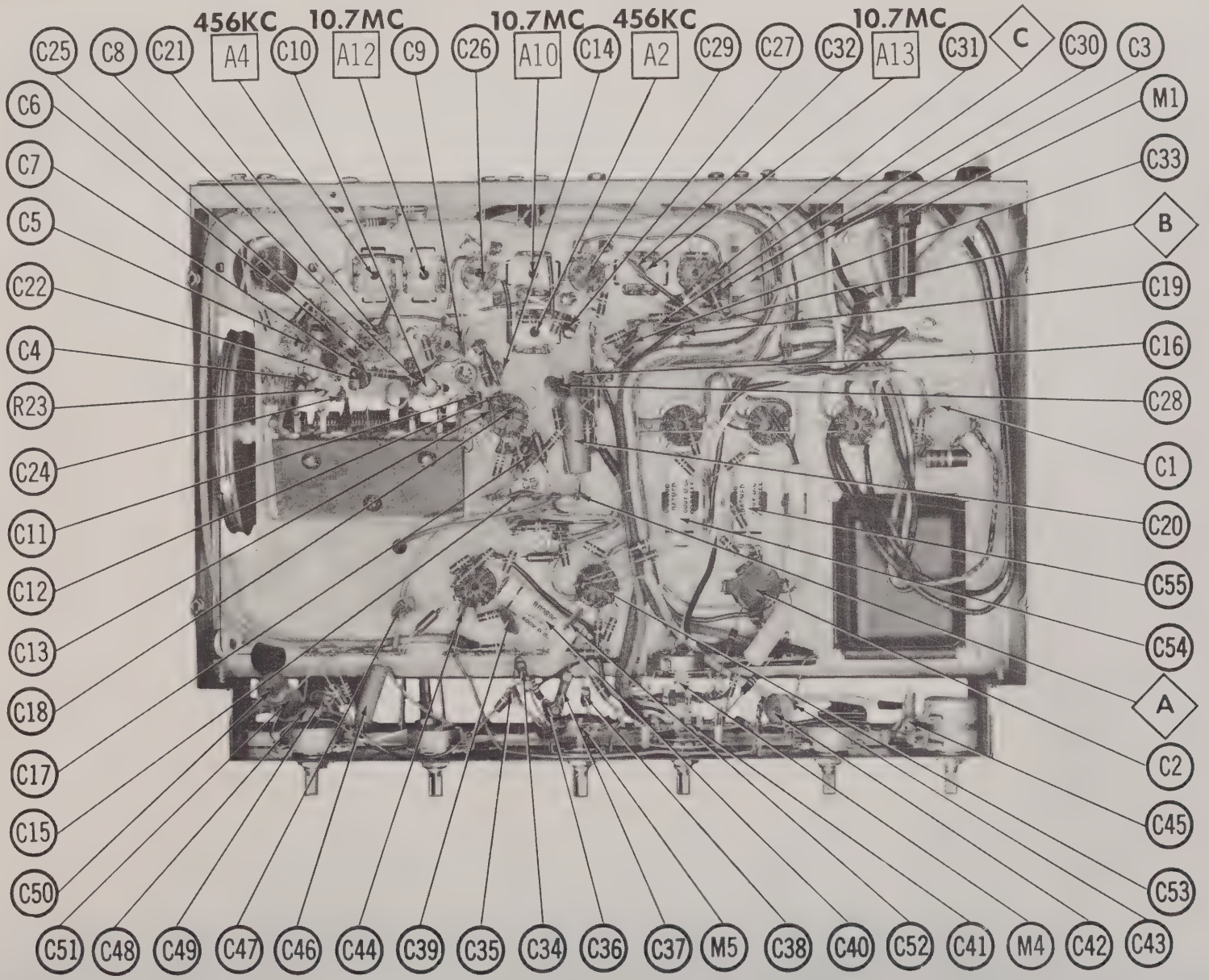
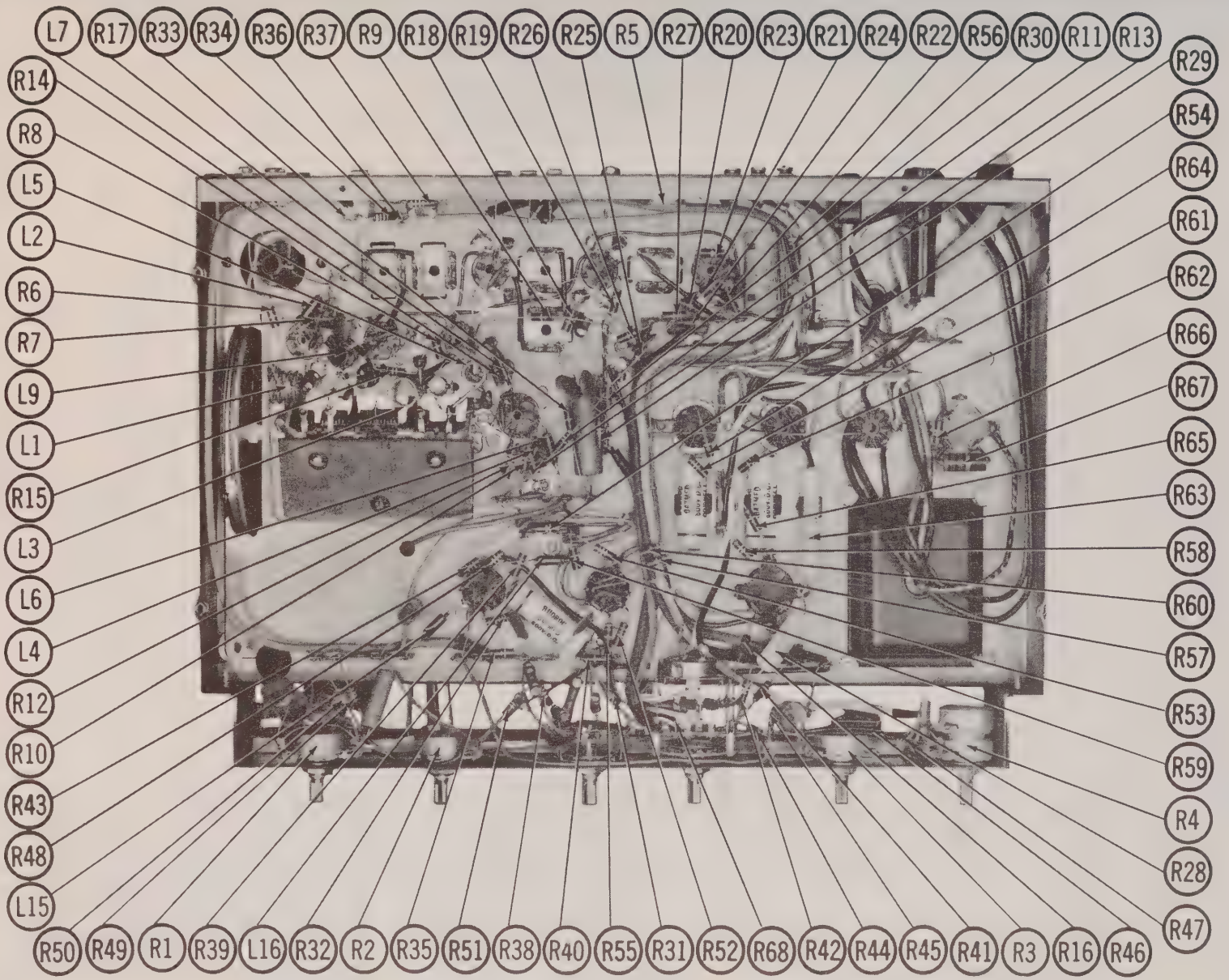


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
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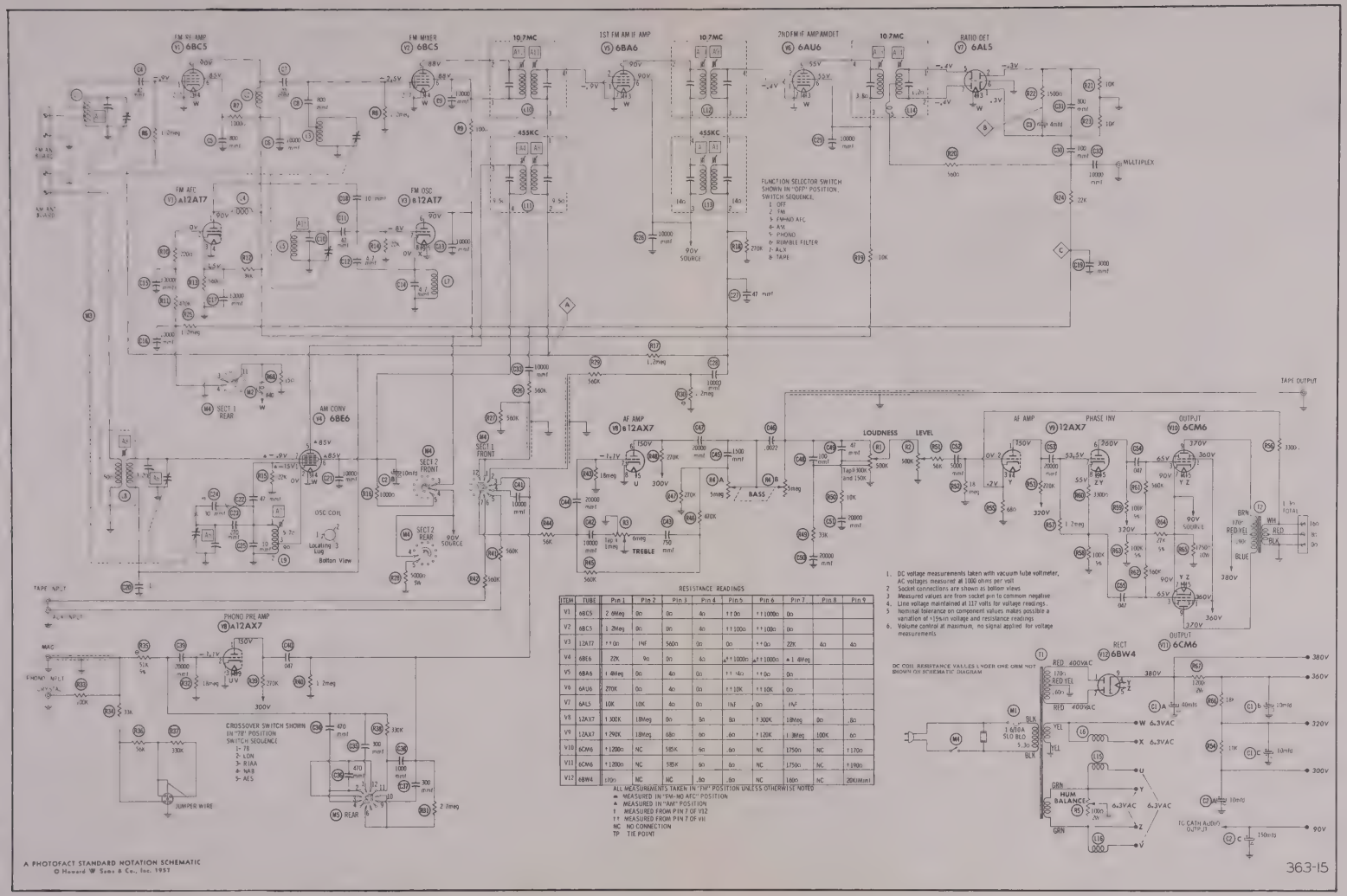
NEWCOMB
MODEL CO-712


FM RF AMP V1 6BC5
FM MIXER V2 6BC5
10.7MC
1ST FM AM IF AMP V5 6BA6
2NDFM IF AMP AMDET V6 6AU6
RATIO DET V7 6AL5
455KC
FM AFC V3 12AT7
FM OSC V3 12AT7
FUNCTION SELECTOR SWITCH SHOWN IN "OFF" POSITION. SWITCH SEQUENCE. 1 OFF 2 FM 3 FM-NO AFC 4 AM 5 PHONO 6 RUMBLE FILTER 7 AUX 8 TAPE
90V SOURCE
MULTIPLEX
AM CONV V4 6BE6
OSC COIL
Locating Lug
Bottom View
SECT 1 REAR
SECT 1 FRONT
SECT 2 FRONT
SECT 2 REAR
AF AMP V9 12AX7
LOUDNESS
LEVEL
BASS
TREBLE
PHASE INV
OUTPUT V10 6CM6
TAPE OUTPUT
PHONO PRE AMP V8 12AX7
CROSSOVER SWITCH SHOWN IN "FM" POSITION SWITCH SEQUENCE 1 FM 2 LCN 3 RIAA 4 NAB 5 AES
JUMPER WIRE
RECT V12 6BW4
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
HUM BALANCE
TC CATH AUDIO
1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BC5	2.6Meg	0Ω	0Ω	4Ω	††0Ω	††100Ω	0Ω		
V2	6BC5	1.2Meg	0Ω	0Ω	4Ω	††100Ω	††100Ω	0Ω		
V3	12AT7	††0Ω	1MΩ	560Ω	0Ω	0Ω	††0Ω	22K	4Ω	4Ω
V4	6BE6	22K	9Ω	0Ω	4Ω	▲††100Ω	▲††100Ω	▲1.4Meg		
V5	6BA6	1.4Meg	0Ω	4Ω	0Ω	††14Ω	††0Ω	0Ω		
V6	6AU6	270K	0Ω	4Ω	0Ω	††10K	††10K	0Ω		
V7	6AL5	10K	10K	4Ω	0Ω	1MΩ	0Ω	1MΩ		
V8	12AX7	†300K	1.8Meg	0Ω	5Ω	8Ω	†300K	1.8Meg	0Ω	.8Ω
V9	12AX7	†290K	1.8Meg	680Ω	0Ω	.6Ω	†120K	1.3Meg	100K	6Ω
V10	6CM6	†1200Ω	NC	585K	6Ω	0Ω	NC	1750Ω	NC	†170Ω
V11	6CM6	†1200Ω	NC	585K	6Ω	0Ω	NC	1750Ω	NC	†190Ω
V12	6BW4	170Ω	NC	NC	.5Ω	.6Ω	NC	160Ω	NC	26KMinΩ

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE NOTED
= MEASURED IN "FM-NO AFC" POSITION
▲ MEASURED IN "AM" POSITION
† MEASURED FROM PIN 7 OF V12
†† MEASURED FROM PIN 7 OF VII
NC NO CONNECTION
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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363-15

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Use an insulated alignment screwdriver for adjusting.
With tuning gang fully closed set dial pointer to "0" on left end of logging scale.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	.01MFD	High side to AM antenna lug on tuning gang. Low side to chassis.	456KC (unmod)	AM (sharp)	Tuning gang fully closed	DC probe to point (A). Common to chassis	A1, A2, A3, A4	Adjust for maximum deflection.
2	"	"	1630KC	"	"	"	A5	"
3	200MMF	High side thru dummy to AM antenna terminal. Low side to chassis.	1400KC	"	Tune to 1400KC signal	"	A6	"
4	"	"	600KC	"	Tune to 600KC signal	"	A7, A8	Adjust for maximum deflection. Repeat steps 2, 3 and 4.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5	.01MFD	High side to pin 1 (grid) of 6BC5 (V2). Low side to chassis.	10.7MC (unmod)	FM (AFC Off)	Point of non-interference	DC probe to point (B). Common to chassis	A9, A10, A11, A12 A13	Adjust for maximum deflection.
6	"	"	"	"	"	DC probe to point (C). Common to chassis	A14	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5	.01MFD	High side to pin 1 (grid) of 6BC5 (V2). Low side to chassis	10.7MC (450KC Swp)	FM (AFC Off)	Point of non-interference	Vert Amplifier to point (B). Low side to chassis.	A9, A10, A11, A12, A13	Disconnect stabilizing capacitor C3. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
6	"	"	"	"	"	Vert amplifier to point (C). Low side to chassis.	A14	Reconnect stabilizing capacitor C3. Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A13 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7	270Ω Carbon resistor	High side thru dummy to FM antenna terminal. Low side to chassis	106MC	FM	106MC	DC probe to point (B). Common to chassis	A15, A16	Adjust for maximum deflection.
8	"	"	90MC	"	90MC	"	L5, L3, L1	Adjust for maximum deflection by compressing or expanding coil turns. Repeat steps 7 and 8.

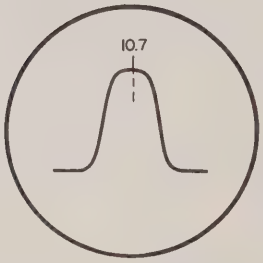


FIG. 1

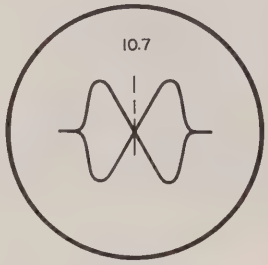


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amplifier	6BC5	
V2	FM Mixer	6BC5	
V3	FM AFC-Osc.	12AT7	
V4	AM Converter	6BE6	
V5	1st. IF Amplifier	6BA6	
V6	2nd. FM IF Amp. -AVC-AM Det.	6AU6	

ITEM No.	USE	TYPE	NOTES
V7	Ratio Detector	6AL5	
V8	Phono PreAmp. -AF Amp.	12AX7	
V9	AF Amp. -Phase Inverter	12AX7	
V10	Output	6CM6	
V11	Output	6CM6	
V12	Rectifier	6BW4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	NEWCOMB PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	475	CE-36	AFH3-50	C0400	FP396.2	TMT-47	Q-075	TVL-3841
B	■10	475	(Note 1)						
C	▲10	475							
D	25	50							
C2A	■10	475	CE-43		B0490	FP396.2	TMT-47	Q-070	R2408 *
B	▲10	475			BR15015	TC495	TD-150-150	MT-15150	
C	▲150	150							
C3	4	25	CE-41	PRS150V4	BBR4-50	TC30	TD-4-25	FM-1504	TVA-1203

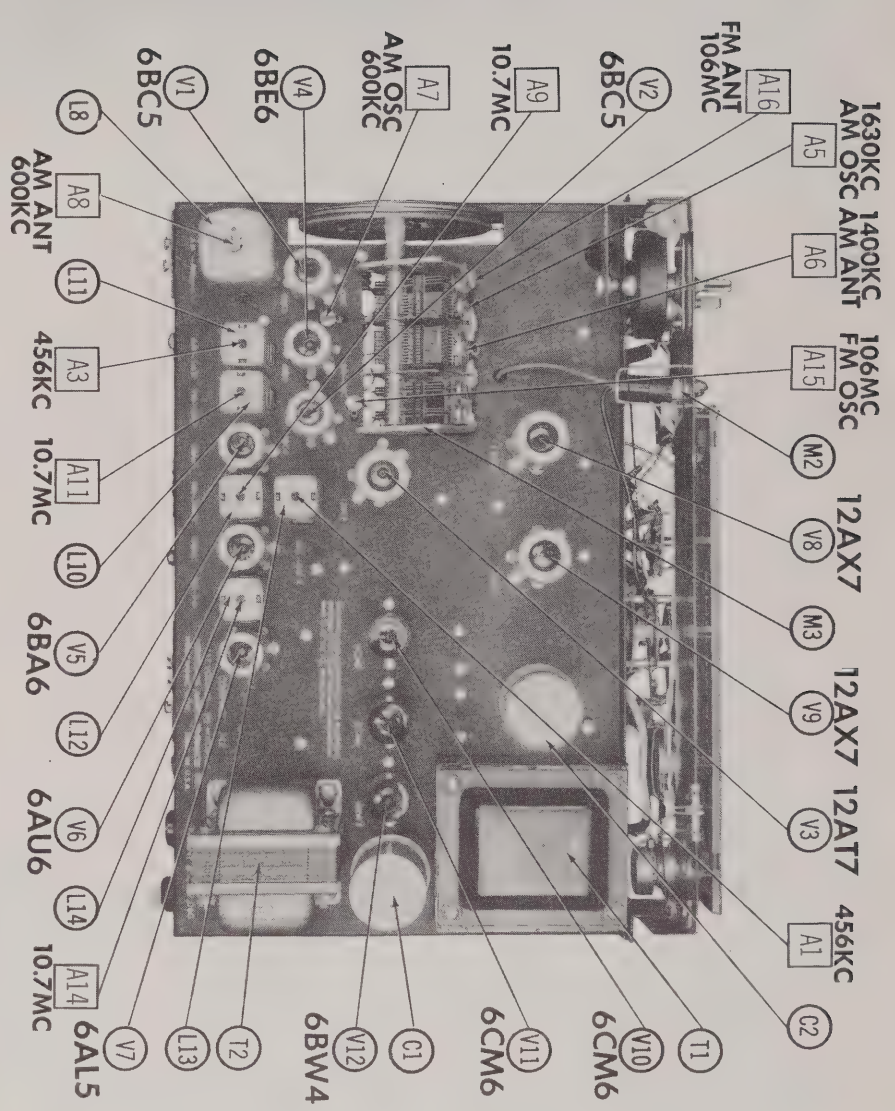
Note 1. C1D is not used
* Non catalog item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	NEWCOMB PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	47		CM-3	SI 47	D6-470	LT6Q47	GP-47	UC-5447	5GA-Q47	
C5	800		CM-44	BPD-0008	DD-801	L10T8	ED-800		5GA-T8	
C6	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C7	22		CM-48	NP0 -SI 22	TCZ-22	C10Q22C	TC0-22		5TCC-Q22	NP0
C8	800		CM-44	BPD-0008	DD-801	L10T8	ED-800		5GA-T8	
C9	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C10										
C11	47		CM-3	NP0 -SI 47	TCZ-47	C10Q47C	TC0-47	ZT-5447	5TCC-Q47	
C12	4.7		CM-47	NP0 -SI 4.7	TCZ-4R7	C10V47C	TC0-4.7	ZT-5547	5TCCB-V47	NP0
C13	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C14	4.7		CM-47	NP0 -SI 4.7	TCZ-4R7	C10V47C	TC0-4.7	ZT-5547	5TCCB-V47	NP0
C15	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C16	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C17	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C18	10		CM-51	N750-SI 10	TCN-10	C10Q10U	TC7-10	NT-541	5TCU-Q1	N750
C19	3000		CM-53	CI-3000	D6 -302	LT6D3	GP-3000	UC-523	5GA-D3	
C20	.1	400	CP-51	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C21	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C22	47		CM-3	SI 47	D6-470	LT6Q47	GP-47	UC-5447	5GA-Q47	
C23	270		CM-49	SI 270	DD-271	L10T27	ED-270	UC-5327	5GA-T27	
C24	30			SI 30	DD-300	L10Q3	ED-30		5GA-Q3	Note 1
C25	10		CM-51	N750-SI 10	TCN-10	C10Q10U	TC7-10	NT-541	5TCU-Q1	N750
C26	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C27	47		CM-3	SI 47	D6-470	LT6Q47	GP-47	UC-5447	5GA-Q47	
C28	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C29	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C30	100		CM-14	SI 100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C31	800		CM-44	BPD-0008	DD-801	L10T8	ED-800		5GA-T8	
C32	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C33	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C34	470		CM-25	SI 470	D6-471	LT6T47	GP-470	UC-5347	5GA-T47	
C35	300		CM-15	SI 300	D6-301	LT6T3	GP-300	UC-533	5GA-T3	
C36	470		CM-25	SI 470	D6-471	LT6T47	GP-470	UC-5347	5GA-T47	
C37	300		CM-15	SI 300	D6-301	LT6T3	GP-300	UC-533	5GA-T3	
C38	1000		CM-38	SI 1000	D6-102	LT6D1	GP-1000	DC521	5HK-D1	
C39	20000		CM-35	BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	
C40	.047	600	CP-49	BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	
C41	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C42	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C43	750		CM-24	SI 750	D6-751	LT6T75	GP-750	UC-5375	5GA-T75	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	NEWCOMB PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C44	20000		CM-32	BPD-02	DD-203	BYB6S2	ED-.02		5HK-S2	
C45	1500		CM-27	SI 1500	D6-152	LT6D15	GP-1500	DC5215	5GA-D15	
C46	.0022	600	CP-48	BPD-0022	D6-222	CUB6D22	ED-.0022	GEM-6222	6TM-D22	
C47	20000		CM-35	BPD-02	DD-203	BYB6S2	ED-.02		5HK-S2	
C48	100		CM-14	SI 100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C49	47		CM-3	SI 47	D6-470	LT6Q47	GP-47	UC-5447	5GA-Q47	
C50	20000		CM-35	BPD-02	DD-203	BYB6S2	ED-.02		5HK-S2	
C51	20000		CM-35	BPD-02	DD-203	BYB6S2	ED-.02		5HK-S2	
C52	5000		CM-34	BPD-005	DD-502	BYA10D5	ED-.005	DC525	5HK-D5	
C53	20000		CM-35	BPD-02	DD-203	BYB6S2	ED-.02		5HK-S2	
C54	.047	600	CP-49	BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	
C55	.047	600	CP-49	BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	

Note 1. Not used in some versions

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	NEWCOMB PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	500K	1/2	RV-71-K				UDT-285	Loudness, Tap@ 150K & 300K
R2A	500K	1/2	RV-41-K	B-60	A47-500K-Z	Q13-133	U48	Level
B	Shaft			Not req.	KSS-3	Not req.	Not req.	
R3	6Meg	1/2	RV-60-K					Treble, Tap@ 1Meg
R4A	5Meg	1/2	RV-57-K					Bass
B	5Meg	1/2						Bass
R5	100Ω	2	RV-75					Hum Balance (Wire Wound)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	NEWCOMB PART No.	IRC PART No.	NOTES
R6	1.2Meg		RR-38	BTS-1.2Meg	
R7	1000Ω		RR-6	BTS-1000	
R8	1.2Meg		RR-38	BTS-1.2Meg	
R9	100Ω		RR-1	BTS-100	
R10	220Ω		RR-2	BTS-220	
R11	470K		RR-33	BTS-470K	
R12	39K		RR-24	BTS-39K	
R13	560Ω		RR-4	BTS-560	
R14	22K		RR-21	BTS-22K	
R15	22K		RR-21	BTS-22K	
R16	1000Ω		RR-6	BTS-1000	
R17	1.2Meg		RR-38	BTS-1.2Meg	
R18	270K		RR-31	BTS-270K	
R19	10K		RR-18	BTS-10K	
R20	560Ω		RR-34	BTS-560	
R21	10K		RR-18	BTS-10K	
R22	1500Ω		RR-8	BTS-1500	
R23	10K		RR-18	BTS-10K	
R24	22K		RR-21	BTS-22K	
R25	1.2Meg		RR-38	BTS-1.2Meg	
R26	560K		RR-34	BTS-560K	
R27	560K		RR-34	BTS-560K	
R28	5000Ω	5	RR-96	PW7-5000	
R29	560K		RR-34	BTS-560K	
R30	1.2Meg		RR-38	BTS-1.2Meg	Note 1
R31	2.7Meg		RR-41	BTS-2.7Meg	
R32	18Meg		RR-140	BTS-18Meg	
R33	100K		RR-27	BTS-100K	
R34	33K		RR-23	BTS-33K	
R35	51K 5%		RR-49	BTS-51K 5%	
R36	56K		RR-25	BTS-56K	
R37	330K		RR-32	BTS-330K	

ITEM No.	RATING OHMS	RATING WATT	NEWCOMB PART No.	IRC PART No.	NOTES
R38	330K		RR-32	BTS-330K	
R39	270K		RR-31	BTS-270K	
R40	1.2Meg		RR-38	BTS-1.2Meg	
R41	560K		RR-34	BTS-560K	
R42	560K		RR-34	BTS-560K	
R43	18Meg		RR-140	BTS-18Meg	
R44	56K		RR-25	BTS-56K	
R45	560K		RR-34	BTS-560K	
R46	470K		RR-33	BTS-470K	
R47	270K		RR-31	BTS-270K	
R48	270K		RR-31	BTS-270K	
R49	33K		RR-23	BTS-33K	
R50	10K		RR-18	BTS-10K	
R51	50K		RR-25	BTS-50K	
R52	18Meg		RR-140	BTS-18Meg	
R53	270K		RR-31	BTS-270K	
R54	10K		RR-18	BTS-10K	
R55	68Ω		RR-174	BTS-68	
R56	3300Ω		RR-12	BTS-3300	
R57	1.2Meg		RR-38	BTS-1.2Meg	
R58	100K		RR-27	BTS-100K	
R59	100K 5%		RR-50	BTS-100K 5%	
R60	3300Ω		RR-12	BTS-3300	
R61	560K		RR-34	BTS-560K	
R62	560K		RR-34	BTS-560K	
R63	100K 5%		RR-50	BTS-100K 5%	
R64	27K 5%		RR-48	BTS-27K 5%	
R65	1750Ω	10	RR-180		
R66	18K		RR-20	BTS-18K	
R67	1200Ω	2	RR-146	BTB-1200	
R68	15Ω		RR-178	BTS-15	

Note 1. Some versions may use 560K in this application (Part #RR-34)

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	NEWCOMB PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .8A	750VCT @ .093A	6.3VAC @ 2.1A	6.3VAC @ 2.5A	TR-186					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	NEWCOMB PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	7600Ω CT	16Ω Tap @ 8Ω	TR-202	Z1405	A-3132①	A-3304	22S93 ①	S-24A ①	① Drill new mounting holes.

COILS (RF-IF)

ITEM No.	USE	NEWCOMB PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM Antenna Coil	RC-14				
L2	RF Choke	RC-6	19-1002	BC-563	4606	2.2 Microhenries
L3	FM Mixer Coil	RC-15				
L4	RF Choke	RC-6	19-1002	BC-563	4606	2.2 Microhenries
L5	FM Oscillator Coil	RC-16				
L6	Fil. Choke	RC-6	19-1002	BC-563	4606	2.2 Microhenries
L7	Cathode Choke	RC-6	19-1002	BC-563	4606	2.2 Microhenries
L8	AM Antenna Coil	RC-12				
L9	AM Oscillator Coil	RC-26				
L10	1st. FM IF	RC-10	16-3487	FM-254	1463	
L11	1st. AM IF	RC-24	16-6758	BC-352	12-C1	
L12	2nd. FM IF	RC-10	16-3487	FM-254	1463	
L13	2nd. AM IF	RC-25	16-6758	BC-353	12-C2	
L14	Ratio Detector	RC-23	17-3498	FM-255	1465	
L15	Fil. Choke	RC-6	19-1002	BC-563	4606	2.2 Microhenries
L16	Fil. Choke	RC-6	19-1002	BC-563	4606	2.2 Microhenries

FUSES

ITEM No.	TYPE	RATING	NEWCOMB PART No. FUSE	NEWCOMB PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	1.6A 125V S/B	FA-19		31301.6 (3AG 1.6A S/B)	341001	MDL 1 6/10	HKP

MISCELLANEOUS

ITEM No.	PART NAME	NEWCOMB PART No.	NOTES
M2	Pilot Light		#40
M3	Tuning Cap	CV-5	5 Gang (AM Section: 22-385 MMF, 15-240 MMF)
M4	Switch	SY-94	Selector, Rotary Wafer Type
M5	Switch	SY-88	Crossover Selector, Rotary Wafer Type

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

OLYMPIC
MODEL 450-V

OLYMPIC
MODEL 450-V

TRADE NAME	Olympic Model 450-V
MANUFACTURER	Olympic Radio & Tel. Corp., 34-01 38th. Ave., Long Island City 1, N. Y.
TYPE SET	Battery Operated Portable AM Receiver
TUBES (Four)	Types 1R5 Converter, 1T4 IF Amplifier, 1S5 Det. -AVC-AF Amp., 3S4 Output
POWER SUPPLY	1.5 Volts DC "A" Supply & 67.5 Volts DC "B" Supply
RATING	225MA @ 1.5 Volts DC & 8MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540KC-1620 KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to B-	455KC	Tuning gang fully open	Across voice coil	A1, A2, A3	Adjust for maximum output.
2		Loop	1620KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	Tune to 1400KC signal	"	A5	"

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	1R5	
V2	IF Amplifier	1T4	

ITEM No.	USE	TYPE	NOTES
V3	Det. -AVC-AF Amp.	1S5	
V4	Output	3S4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	OLYMPIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	10	150	COJ25008	PRS150V10	BBR10-150	TC42	TD-10-150	MT-1510	TVA-1406

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2A	10000		COJ25010	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
B	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C	250			BPD-00025	DD-251	L10T25	ED-250	UC-5325	5GA-T25	
D	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
E	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C3	10	500		1468-00001	DD-100	5W5Q1	CY10C100K	MC215	1FM-41	
C4	150			NPO-S1 150	TCZ-150	LT6T15	TCO-150	ZT-5315	5TCC-T15	NPO
C5	.001	400		S1 1000	D6-102	CUB6D1	GP-1000	GEM621	6TM-D1	
C6	.005	400		S1 5000	D6-502	CUB6D5	GP-5000	GEM625	6TM-D5	
C7	250	500		1468-00025	DD-251	5W5T25	ED-250	MC240	1FM-325	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	OLYMPIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1Meg	½	PTJ25002					Volume & Switch

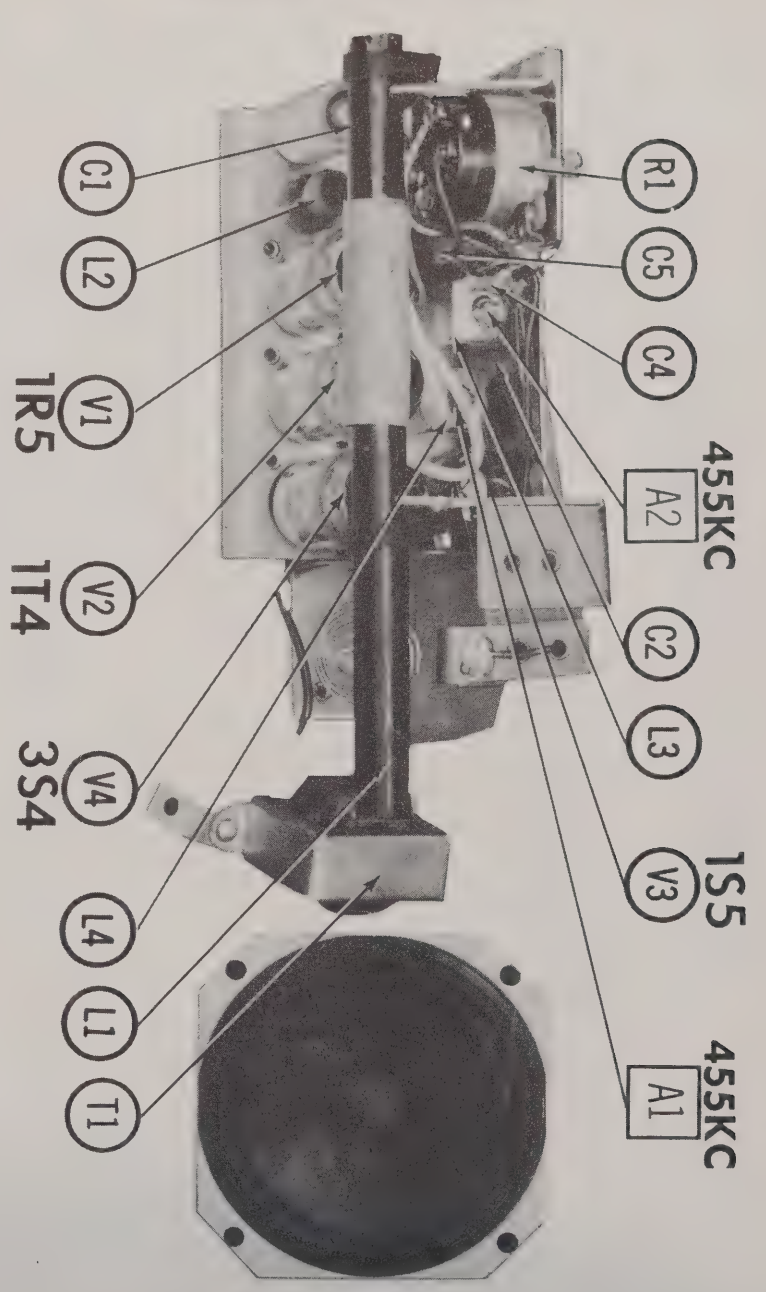
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	OLYMPIC PART No.	IRC PART No.	
R2	100K			BTS-100K	
R3	3.3Meg			BTS-3.3Meg	
R4	10K			BTS-10K	
R5	47K			BTS-47K	
R6	3.3Meg			BTS-3.3Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	OLYMPIC PART No.	IRC PART No.	
R7	220K			BTS-220K	
R8	1Meg			BTS-1Meg	
R9	10Meg			BTS-10Meg	
R10	1Meg			BTS-1Meg	
R11	820Ω			BTS-820	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	5300Ω	16Ω	TRJ25005						

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	OLYMPIC PART No.	QUAM PART No.	
SP1	2½"	PM	16Ω	SKJ25004	25A07Z16	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		OLYMPIC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Stick	LPJ25007				
L2	Osc. Coil	CLJ25006				
L3	Input IF	TRJ25013				
L4	Output IF	TRJ25014				

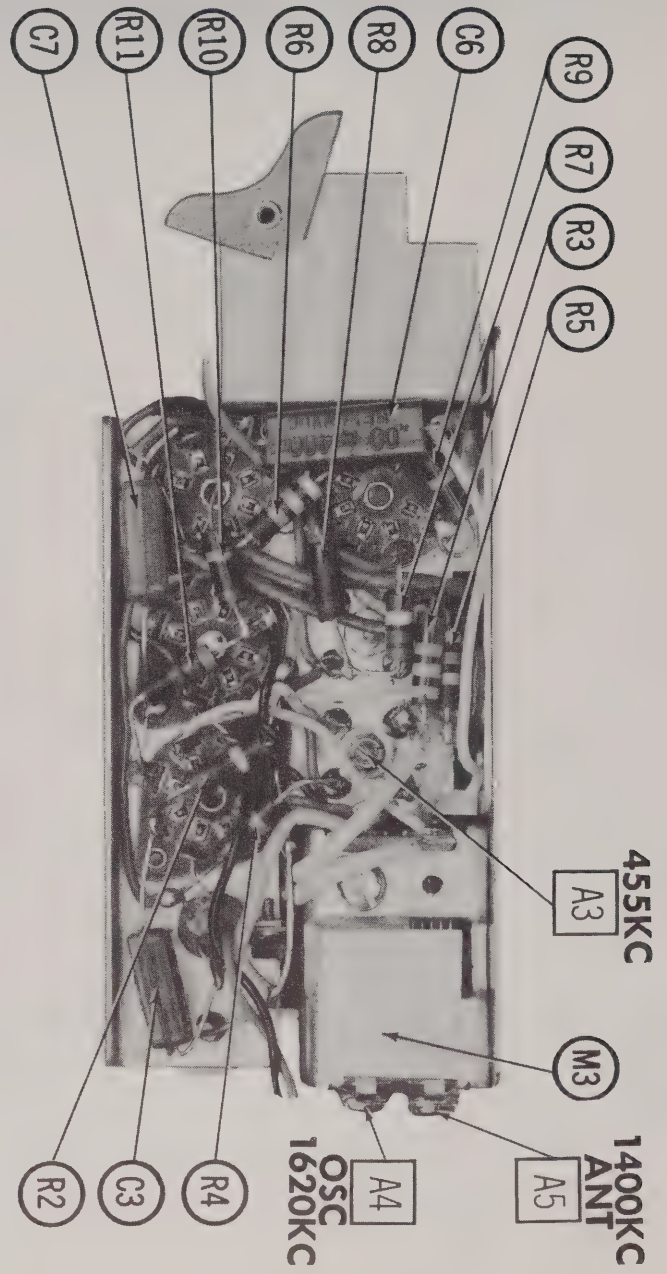
BATTERIES

ITEM No.	VOLTAGE	OLYMPIC PART No.	REPLACEMENT DATA								NOTES
			BURGESS		EVEREADY		MALLORY		RAY-O-VAC		
			"A"	"B"	"A"	"B"	"A"	"B"	"A"	"B"	
M1	1½V		2R		950		M-13		2LP		
M2	67½V			P45		477		M-211P		211P	

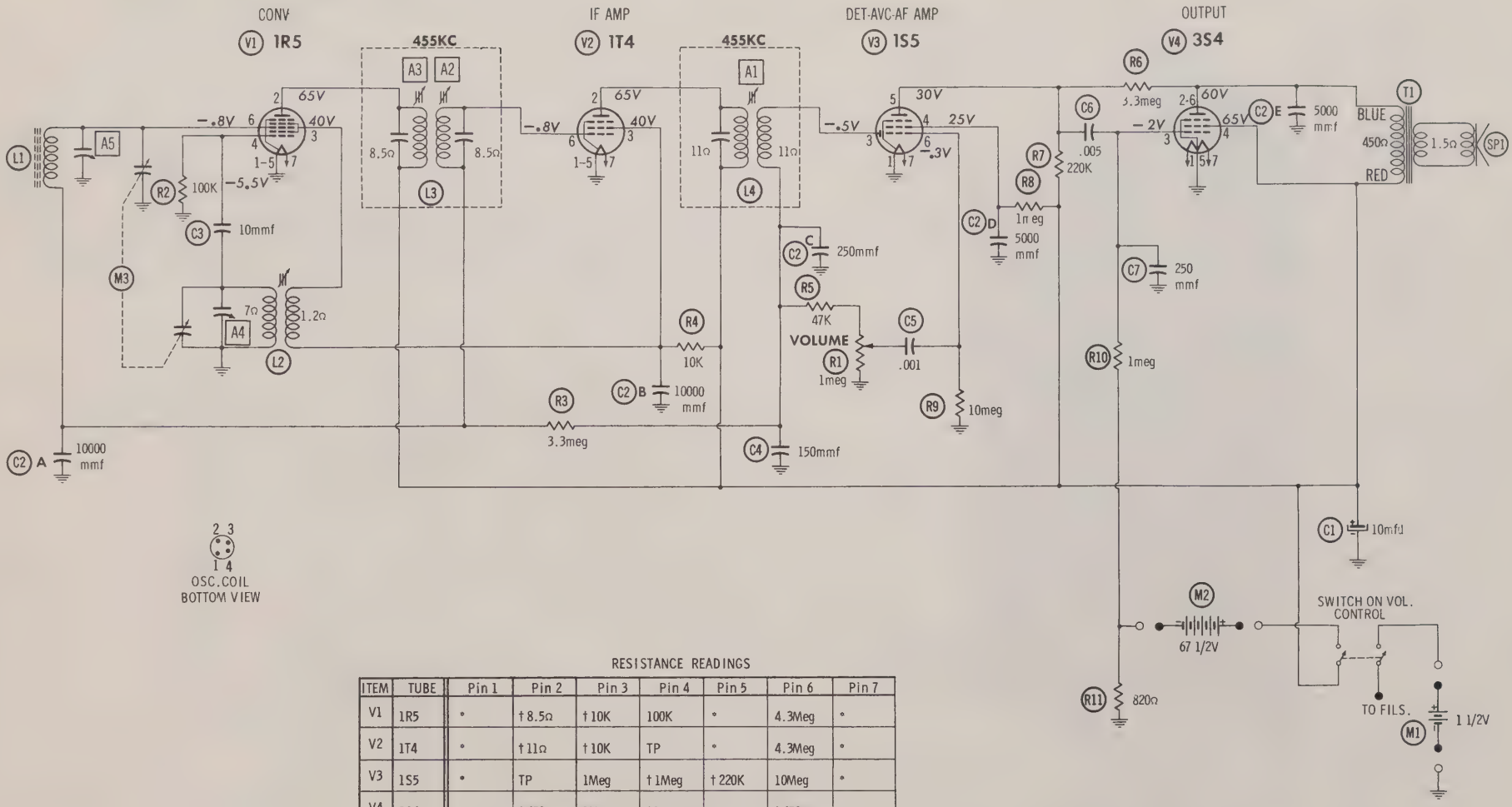
MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M3	Tuning Cap.	CVJ25003	2 Gang (Ant. 8-195MMF, Osc. 8-90MMF)
	Knob	KNJ25009	Dial
	Knob	KNJ25011	Volume
	Cabinet	CAJ25000	Less Handle
	Cabinet Back	CAJ25001	
	Handle	MPJ25017	With Rings
	Screw	SCJ25012	Dial

CHASSIS—BOTTOM VIEW



OLYMPIC MODEL 450-V



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	1R5	*	†8.5Ω	†10K	100K	*	4.3Meg	*
V2	1T4	*	†11Ω	†10K	TP	*	4.3Meg	*
V3	1S5	*	TP	1Meg	†1Meg	†220K	10Meg	*
V4	3S4	*	†450Ω	1Meg	†0Ω	*	†450Ω	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE
† MEASURED FROM POSITIVE SIDE OF C1
TP TIE POINT

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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SONORA
MODELS 524, 525, 526

SONORA
MODELS 524, 525, 526

SONORA
MODELS 524, 525, 526

TRADE NAME	Sonora Models 524, 525, 526
MANUFACTURER	Sonora Radio & Tel. Corp., 325 N. Hoyne Ave., Chicago, Ill.
TYPE SET	AC-DC Operated AM Receiver
TUBES (Four)	Types 12AU6 Converter, 12AV6 Det.-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC RATING .24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to antenna stator lug. Low side to B-.	455KC (400∿Mod)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A3	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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DENVER, COLORADO

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PARTS LIST AND DESCRIPTIONS

SCNORA MODEL 524

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12AU6	
V2	Detector - AF Amplifier	12AV6	
V3	Output	50C5	
V4	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SCNORA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	R-1482	PRS150/25V	BBRT4215C	TCT3114	TDLT-12	FMT-321	TVA-3423
B	20	150		4020/20					
C	20	15							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	SCNORA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	100		N-6015	SI 100	D6-101	TP34	GP-100	UC-531	5GA-T1	
C3	56									
C4	56									
C5	10000		N-9062	BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C6	.022	400	N-1461	BPD-02	DF-203	CUB4S22	ED-02	GEM-4122	4TM-S22	
C7	.047	200	R-1462	BPD-05	DF-503	CUB2S47		GEM-4147	2TM-S47	

CONTROLS

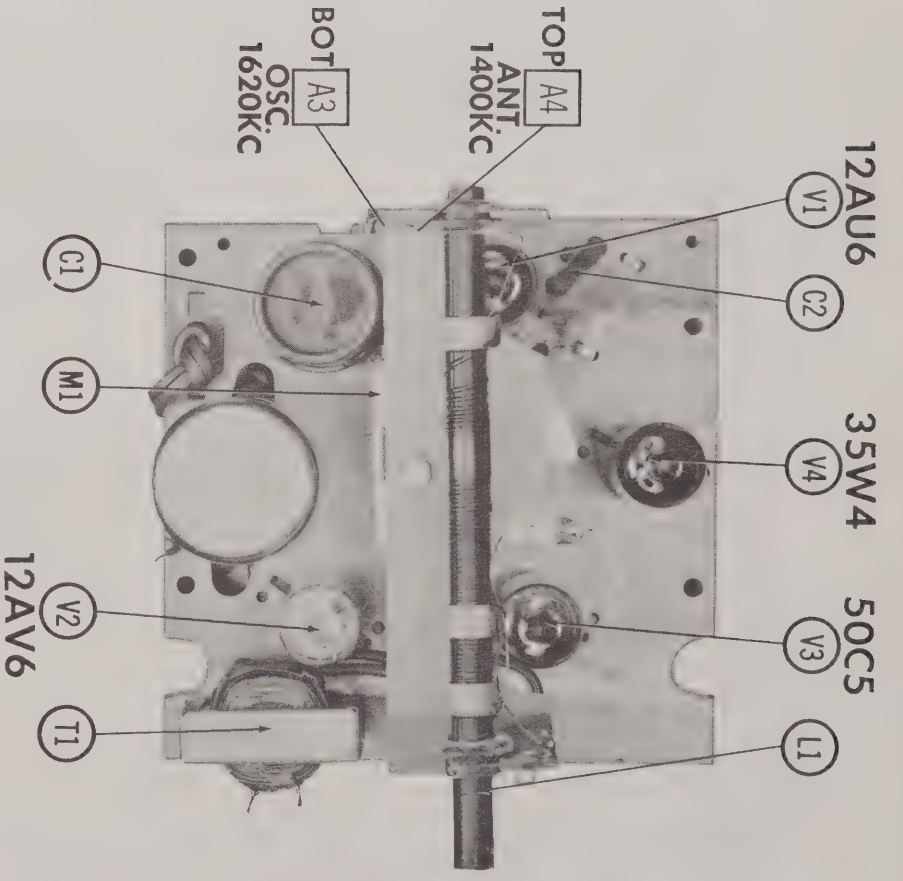
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SCNORA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2Meg	½	R-1455	AB-76	A47-2Meg-Z	Q13-139	U55	Volume
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1	SWE-12	76-1	US-26	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SCNORA PART No.	IRC PART No.	
R2	2.7Meg		N-8027	BTS-2.7Meg	
R3	180Ω		N-4067	BTS-180	
R4	2200Ω		N-4896	BTS-2200	
R5	22Ω		N-5889	BTS-22	
R6	68Ω	2	R-1483		

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SONORA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3200Ω	3-4Ω	R-1480	Z1101	A-3025	A-3332	26S58	S-12X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	SONORA PART No.	QUAM PART No.		
SP1	4"	PM	3-4Ω	R-1478	4A07		

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		SONORA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Stick	R-1811				
L2	Osc. Coil	R-1486				
L3	IF Trans.	R-1484				

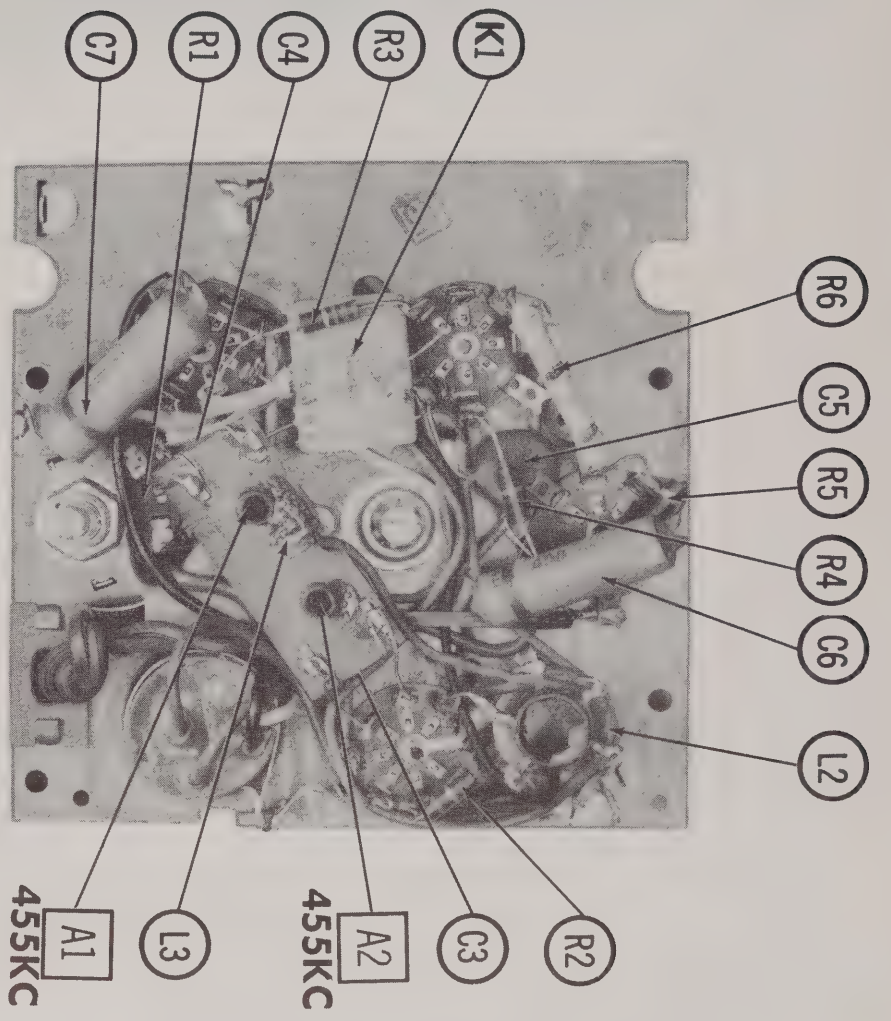
COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SONORA PART No.	REPLACEMENT DATA	
K1	Detector-Audio Circuit	5000MMF, 2000MMF, 220MMF, 250MMF, 6.8Meg, 470K, 470K	R-1487	Aerovox Centralab Cornell-Dubilier Erie Sprague	PA-113-1 PC-150 116TM1 1408-01 DT-1

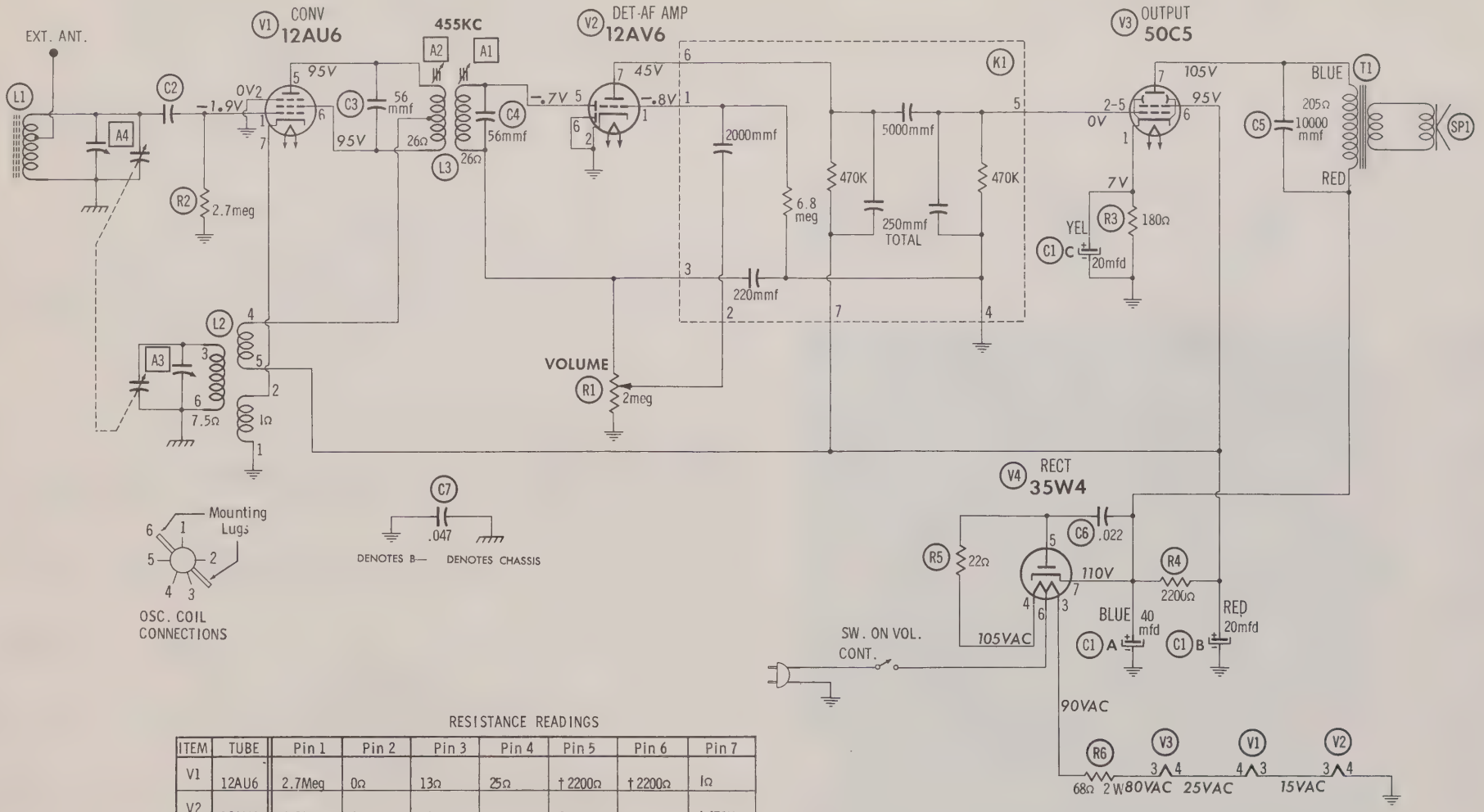
MISCELLANEOUS

ITEM No.	PART NAME	SONORA PART No.	NOTES
M1	Tuning Cap.	R-1481	2 Gang (21-290MMF, 12-115MMF)

CHASSIS—BOTTOM VIEW



SONORA MODEL 524



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12AU6	2.7Meg	0Ω	13Ω	25Ω	†2200Ω	†2200Ω	1Ω
V2	12AV6	6.8Meg	0Ω	13Ω	0Ω	2Meg	0Ω	†470K
V3	50C5	180Ω	470K	75Ω	25Ω	470K	†2200Ω	†205Ω
V4	35W4	NC	NC	145Ω	180Ω	205Ω	175Ω	100K

† MEASURED FROM PIN 7 OF V4.
NC NO CONNECTION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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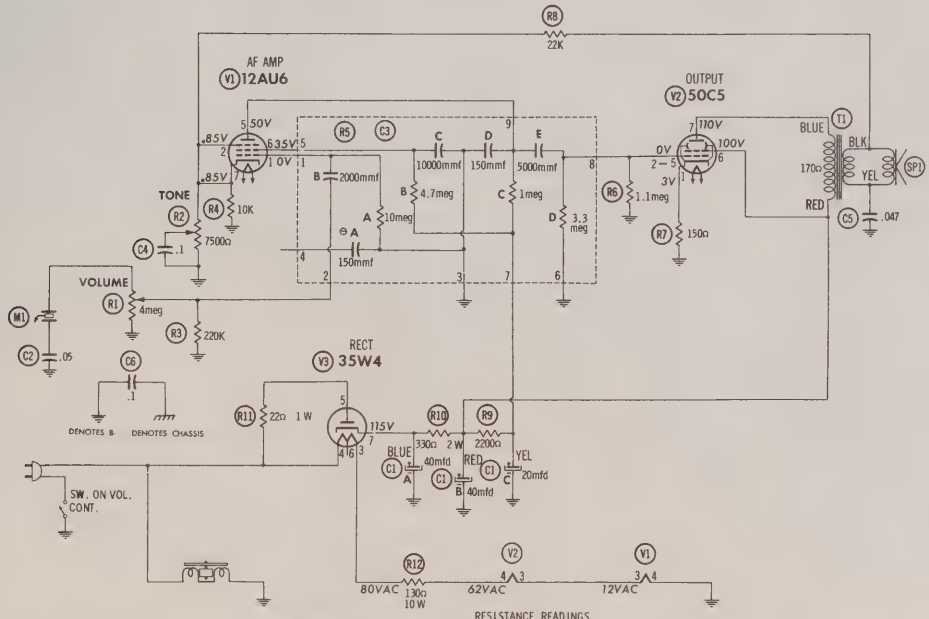
STEELMAN
MODEL 3S4C

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

STEELMAN
MODEL 3S4C

TRADE NAME	Steelman Model 3S4C
SUPPLIER	Spiegel Inc., 1061 W. 35th St., Chicago 9, Ill.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Manual Record Player
TUBES (Three)	Types 12AU6 AF Amplifier, 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .25 Amp. @ 117 Volts AC



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12AU6	10Meg	3000Ω	12Ω	0Ω	†1Meg	†4.7Meg	3000Ω
V2	50C5	150Ω	900K	12Ω	62Ω	900K	†330Ω	†500Ω
V3	35W4	TP	TP	200Ω	235Ω	260Ω	228Ω	10K

ALL MEASUREMENTS TAKEN WITH PHONO-MOTOR DISCONNECTED
† MEASURED FROM PIN 7 OF V3
TP TIE POINT

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363-18

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	12AU6	
V2	Output	50C5	
V3	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA STEELMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150		PRS150V4040	BBRT44215	TCT3116	TDLT-4	FMT-312	TVA-3448
B	40	150		20					
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA STEELMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C3A	150					G046	811-151	UC-5315		
B	2000					K072	801-002	DC522		
C	10000			† PA-136	† PC-160	K082	811-01	DC511	† DP-1	
D	150					G046	811-151	UC-5315		
E	5000					K080	811-005	DC525		
C4	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C5	047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C6	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	

† Items C3A, C3B, C3C, C3D, C3E, R5A, R5B, R5C, and R5D are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA STEELMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	4Meg	½	VC-74	AB-862	A47-4Meg-Z	Q13-141	U65	Volume
B	Shaft			AK-4	KSS-3	Not req.	Not req.	
C	Switch			KB-1	SWE-12	76-1	US-26	
R2A	7500Ω	½	VC-75	AB-13	A47-7500-S	Q11-115	U20	Tone
B	Shaft			AK-4	KSS-3	Not req.	Not req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA STEELMAN PART No.	IRC PART No.	NOTES
R3	220K			BTS-220K	
R4	10K			BTS-10K	
R5A	10Meg			BTS-10Meg	
B	4.7Meg		†	BTS-4.7Meg	
C	1Meg			BTS-1Meg	
D	3.3Meg			BTS-3.3Meg	
R6	1.1Meg			BTS-1Meg	

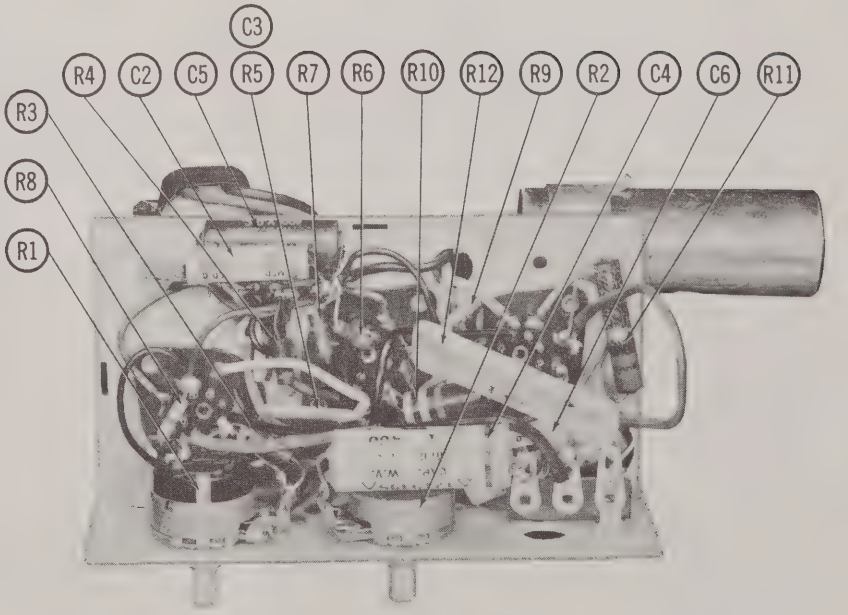
ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA STEELMAN PART No.	IRC PART No.	NOTES
R7	150Ω			BTS-150	
R8	22K			BTS-22K	
R9	2200Ω			BTS-2200	
R10	330Ω	2		BTB-330	
R11	22Ω	1		BW1-22	
R12	130Ω	10		1 3/4A-125	

† Items R5A, R5B, R5C, R5D, C3A, C3B, C3C, C3D, C3E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA STEELMAN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	3000Ω	3-4Ω	TR-114	Z1000	A-3031 ①	A-3877	22S45	S-1X	① Ignore hum bucking taps.

CHASSIS—BOTTOM VIEW



SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA STEELMAN PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	SP-44	4A07	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA STEELMAN PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. MOUNT	REMARKS
M1		53-2 * F-53	G-AG	* 2443		* Complete Tone Arm and Cartridge Assembly

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA STEELMAN PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M2		* A-842 or † A-742 or ♦ A-742D	* W-3AGA or † W-3AGS or ♦ W-3AGD	* Metal † Jewel ♦ Diamond

TRUETONE
MODEL D3780A

TRUETONE
MODEL D3780A

TRADE NAME	Truetone Model D3780A
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Battery Operated Portable AM Receiver
TUBES (Four)	Type 1R5 Converter, 1U4 IF Amplifier, 1U5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY	1.5 Volts DC "A" Supply & 67.5 Volts DC "B" Supply RATING 260MA @ 1.5 volts DC & 9MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	535KC-1650KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to antenna stator lug on tuning gang. Low side to chassis.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1650KC	"	"	A5	"
3.		Loop	1500KC	Tune to 1500KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	600KC	600KC	"	A7	Adjust for maximum output while rocking tuning gang.

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PARTS LIST AND DESCRIPTIONS

TRUETONE MODEL D3780A

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	1R5	
V2	IF Amplifier	1U4	
V3	Det.-AVC-AF Amp.	1U5	
V4	Output	3V4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	10	100	150-128	PRS150V10	BBR10-150	TC42	TD-10-150	FM-1510	TVA-1406

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	2000		158-103	BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	Note 1
C3	.05	200	152-104	BPD-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C4	2000		158-103	BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C5	2000		158-103	BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	

Note 1. Some versions may use 1500MMF in this application (Part #158-109).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TRUETONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1Meg	½	120-129					Volume

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

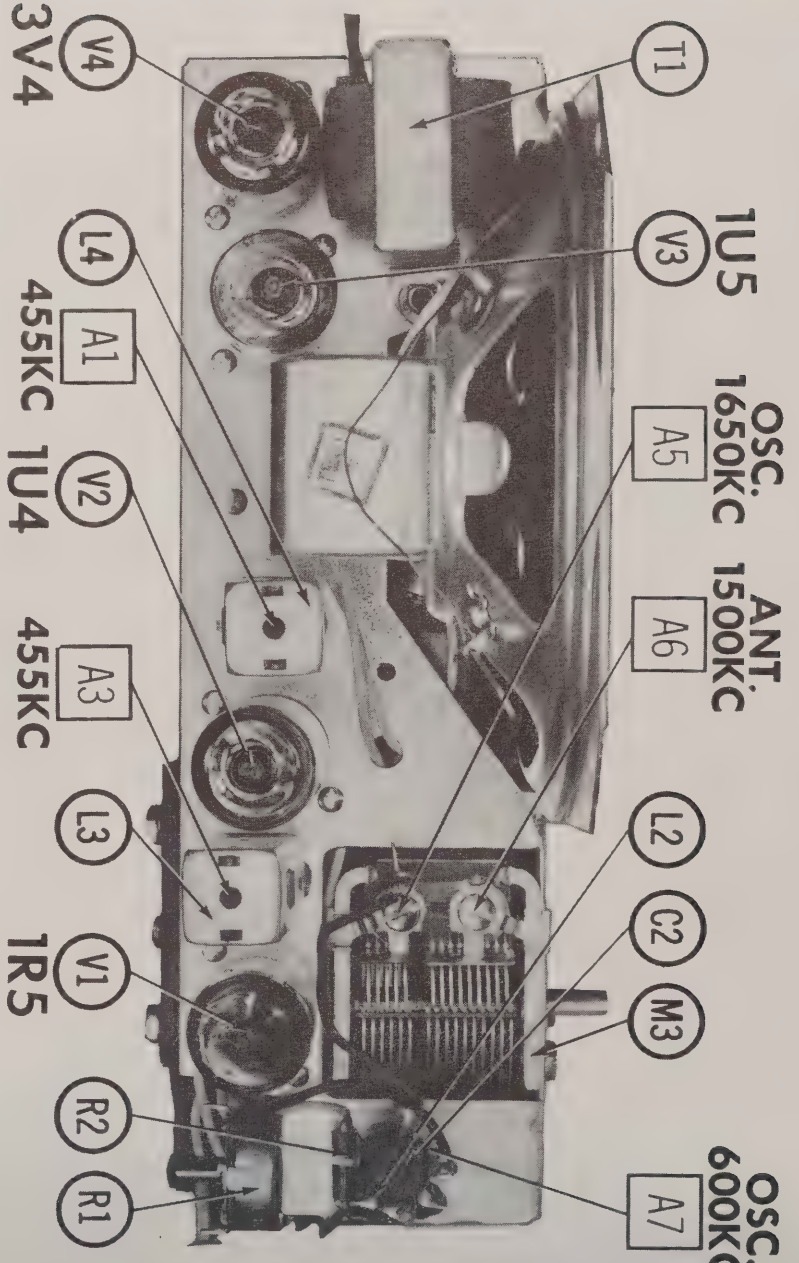
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	TRUETONE PART No.	IRC PART No.	
R2	100K		180-116	BTS-100K	
R3	15K		180-115	BTS-15K	
R4	3.9Meg			BTS-3.9Meg	Note 1
R5	6.8Meg		180-135	BTS- 6.8Meg	
R6	390Ω		180-176	BTS-390	

Note 1. Some versions may use a 3.3Meg (Part #180-137) in this application.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	10.8K	3-4Ω	138-116 138-119 *		A-2927	A-3329 ①	24S49①	S-11Z	① Use original channel mounting frame. * Alternate transformer

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	TRUETONE PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	175-129	4A07	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		TRUETONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Stick	132-133				
L2	Osc. Coil	136-132			69-OSC	
L3	Input IF	130-117	16-6800	BC-348	10-C1	
L4	Output IF	130-117	16-6801	BC-349	10-C2	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	TRUETONE PART No.	REPLACEMENT DATA	
K1	Diode RF Filter	100MMF, 100MMF, 47K	166-107	Aerovox Centralab Cornell-Dubilier Erie Sprague	PA-97-1 PC-50 111TM1 1403-01 D-1
K2	Audio Coup. Net.	5000MMF, 5000MMF, 100MMF, 4.7Meg, 1Meg, 2.2Meg	166-110	Aerovox Centralab Cornell-Dubilier Erie Sprague	PA-117 PC-91 114TM2 1407-03 P-2

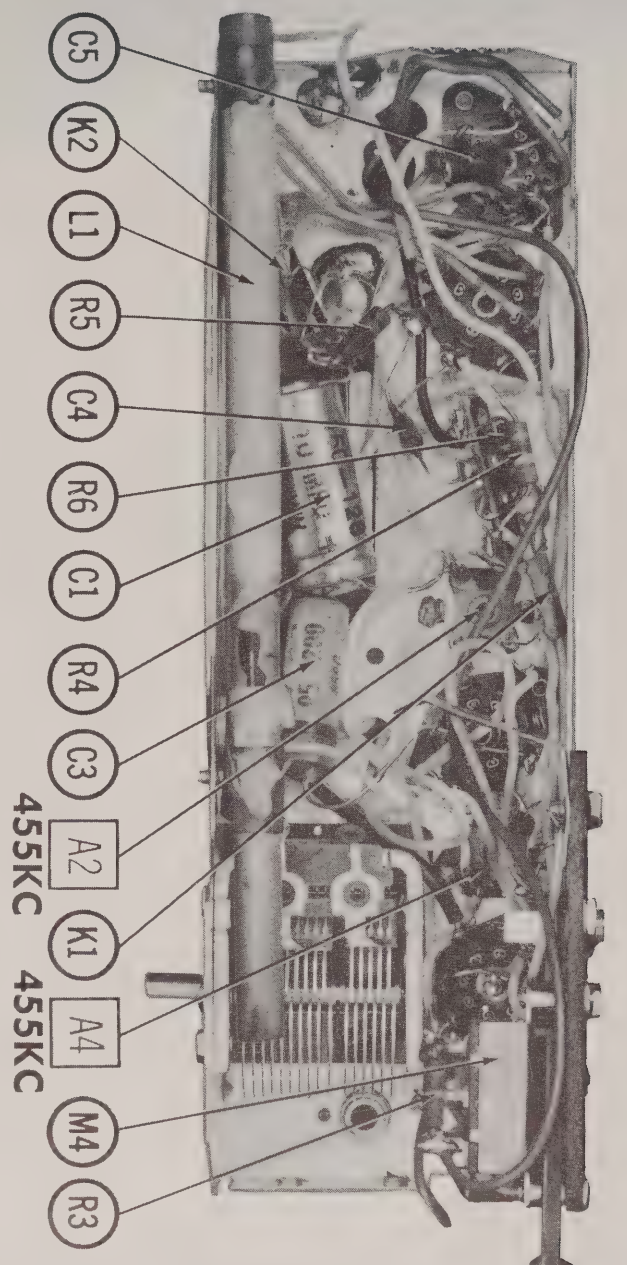
BATTERIES

ITEM No.	VOLTAGE	TRUETONE PART No.	REPLACEMENT DATA								NOTES
			BURGESS		EVEREADY		MALLORY		RAY-O-VAC		
			"A"	"B"	"A"	"B"	"A"	"B"	"A"	"B"	
M1	1½		21R		964		M-20		20		
M2	67½			P45		477		M-211P		211P	

MISCELLANEOUS

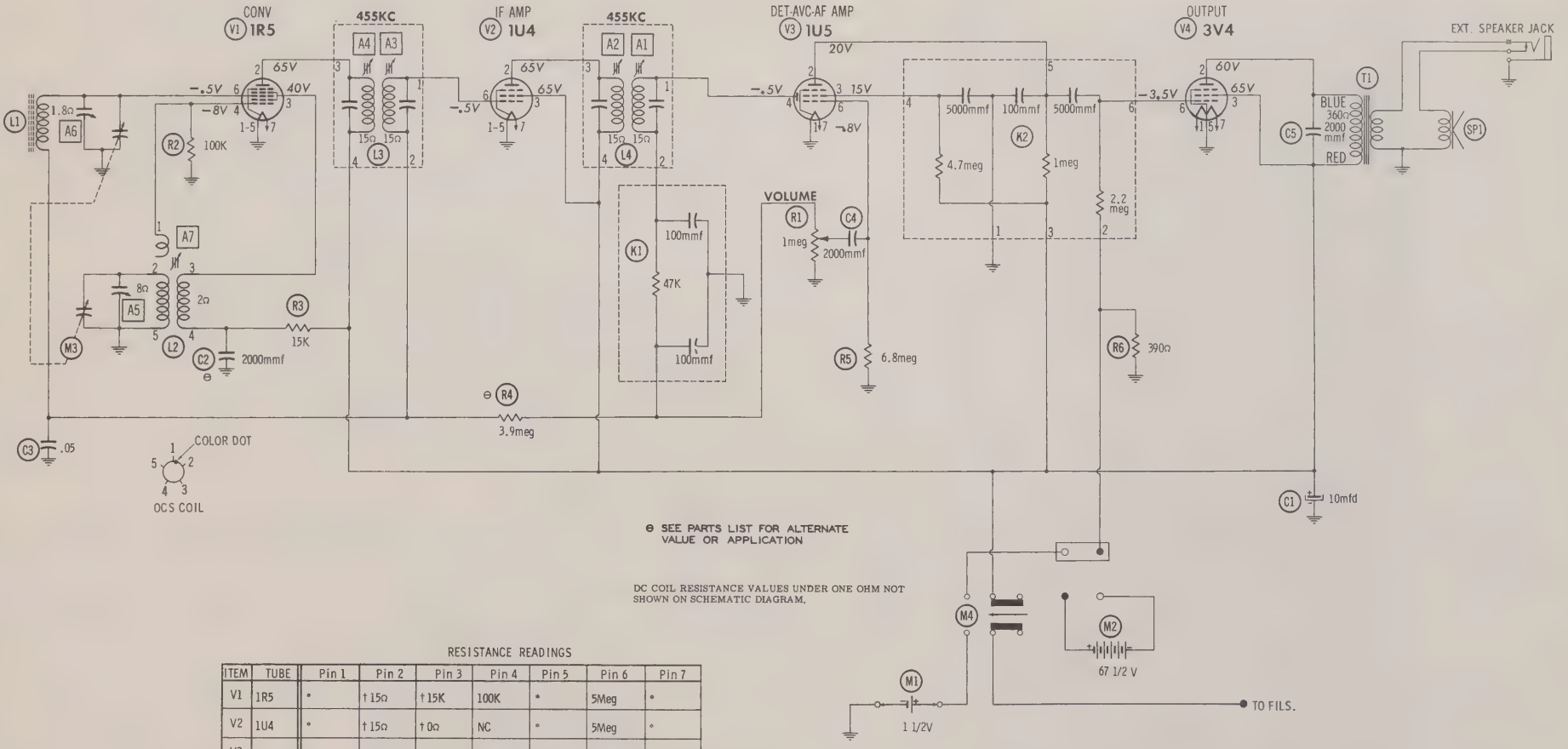
ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M3	Tuning Cap.	160-121	Two Gang (10-235MMF, 10-110MMF)
M4	Switch	125-119	On-off, Slide Type (DPDT)
	Handle	220-139	On-off switch
	Earphone Jack	170-134	
	Knob	220-137	Tuning
	Knob	220-138	Volume
	Cabinet	210-125	Complete assy.

CHASSIS—BOTTOM VIEW



TRUETONE MODEL D3780A

TRUETONE MODEL D3780A



⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	1R5	*	†15Ω	†15K	100K	*	5Meg	*
V2	1U4	*	†15Ω	†0Ω	NC	*	5Meg	*
V3	1U5	*	†1Meg	†4.7Meg	1Meg	TP	6.8Meg	*
V4	3V4	*	†360Ω	†0Ω	TP	*	2.2Meg	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
† MEASURED FROM POSITIVE SIDE OF C1.
NC NO CONNECTION.
TP TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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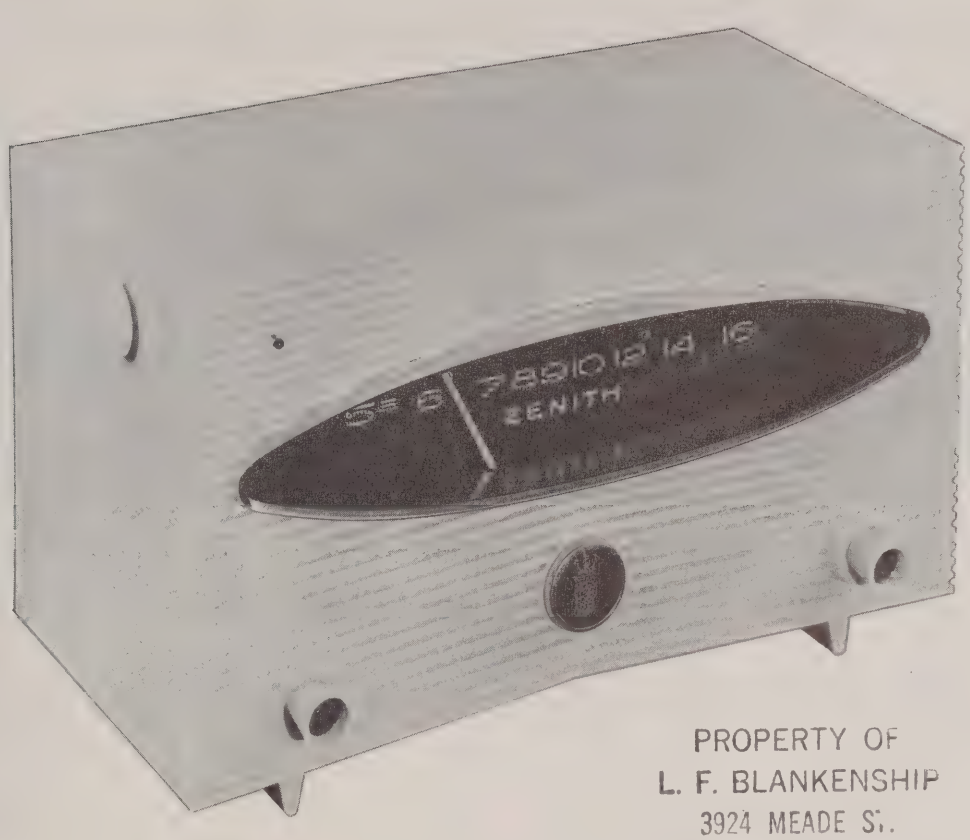
ZENITH MODELS
Z615F, G, R, W (Ch. 6Z05)



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

ZENITH MODELS
Z615F, G, R, W (Ch. 6Z05)

TRADE NAME	Zenith Models Z615F, Z615G, Z615R, Z615W (Ch. 6Z05)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Ill.
TYPE SET	AC-DC Operated AM Receiver
TUBES (Six)	Types 12BA6 RF Amplifier, 12BE6 Converter, 12BA6 IF Amplifier, 12AT6 Det.-AVC-AF Amp., 35C5 Output 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC
RATING	.3 Amp. @ 117 Volts AC (29 Watts)
TUNING RANGE—BROADCAST	535KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in the same relative position to chassis as when the receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.5MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to B-.	455KC (400~ Mod.)	600KC	Across voice coil	A1, A2 A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2		Loop	1600KC	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	Tune to 1400KC signal	"	A6, A7	"

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PARTS LIST AND DESCRIPTIONS

ZENITH
MODEL Z615F (Ch. 6Z05)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BA6	
V2	Converter	12BE6	
V3	IF Amplifier	12BA6	
V4	Det. -AVC-AF Amp.	12AT6	
V5	Output	35C5	
V6	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■80	150	22-2351	AFH2-19	XB0181	FP216	TMD-16	D-085	TVL-2442
B	▲40	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	200	22-2792	BPD-05	DF-503	CUB2S47		GEM-4147	2TM-S47	
C3	.047	200	22-2792	BPD-05	DF-503	CUB2S47		GEM-4147	2TM-S47	
C4	.01	200	22-2810	BPD-01	DD-103	CUB2S1	GP-10000	GEM-411	2TM-S1	
C5	10000		22-3	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C6	470	1000	22-6	HVD-15-470	DD30-471	BYA10T47	HD-15-470	DC30347	10GABT47	
C7	10000		22-3	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C8	4700		22-4	BPD-0047	DD-472	BYA10D47	ED-.0047	DC5247	5HK-D47	
C9	.01	400	22-2811	BPD-01	DD-103	CUB4S1	ED-.01	GEM-411	4TM-S1	
C10	.1	200	22-2780	P288N-1	DF-104	CUB2P1		GEM-401	2TM-P1	
C11	10000		22-3	BPD-01	DD-103	BYA6S1	ED-.01	DC511	5HK-S1	
C12	.047	200	22-2792	BPD-05	DF-503	CUB2S47		GEM-4147	2TM-S47	

CONTROLS

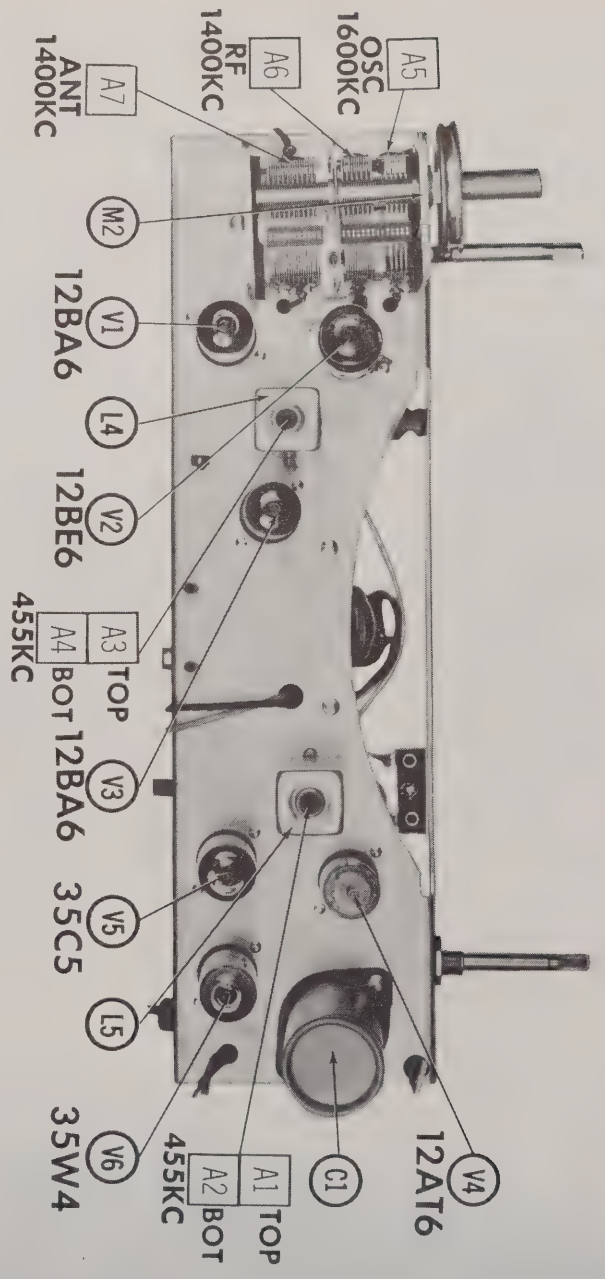
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1.5Meg	½	63-3679	BT-78	A47F3-2Meg		UT-451	Volume, Tap@ 1meg
B	Shaft			Not req.	KSS-3		Not req.	
C	Switch			KB-1	SWE-12		US-26	
R2A	1Meg	½	63-3640	B-70	A47-1Meg-Z	Q13-137	U53	Tone
B	Shaft			Not req.	KSS-3	Not req.	Not req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ZENITH PART No.	IRC PART No.	
R3	10K			BTS-10K	
R4	330Ω			BTS-330	
R5	1000Ω			BTS-1000	
R6	22K			BTS-22K	
R7	68Ω			BTS-68	
R8	4.7Meg			BTS-4.7Meg	
R9	2.2Meg			BTS-2.2Meg	
R10	470K			BTS-470K	
R11	100K			BTS-100K	
R12	1800Ω			BTS-1800	
R13	470K			BTS-470K	
R14	470K			BTS-470K	
R15	2200Ω			BTS-2200	
R16	150Ω			BTS-150	
R17	1000Ω	1	63-1574	BTA-1000	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3200Ω	3-4Ω	95-1522	Z1103 ①	A-2928	A-3876	22S46	S-1X	① Tape tap on primary winding.

SPEAKER

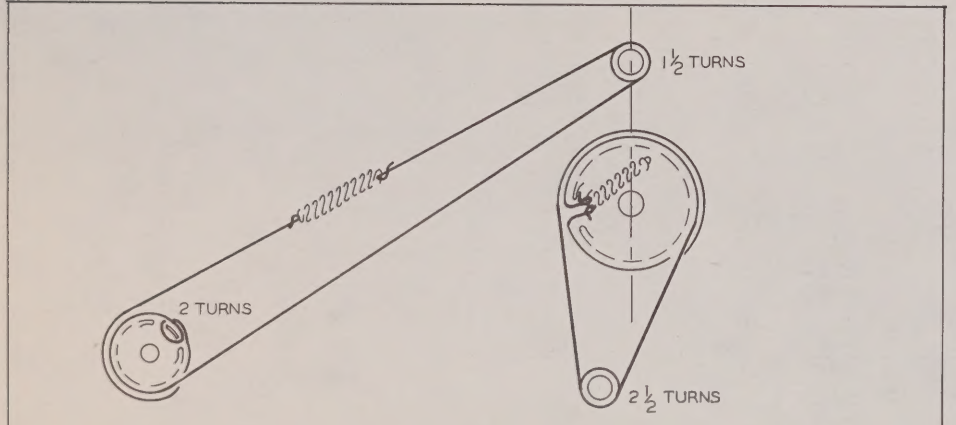
ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ZENITH PART No.	QUAM PART No.	
SP1	6"X9"	PM	3-4Ω	49-811	69A3	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	S-40273				Includes cabinet back
L2	RF Coil	S-23729				
L3	Osc. Coil	S-23728	14-1073			
L4	Input IF	95-1504	16-6780	BC-356	13-PC1	
L5	Output IF	95-1505			13-PC6	

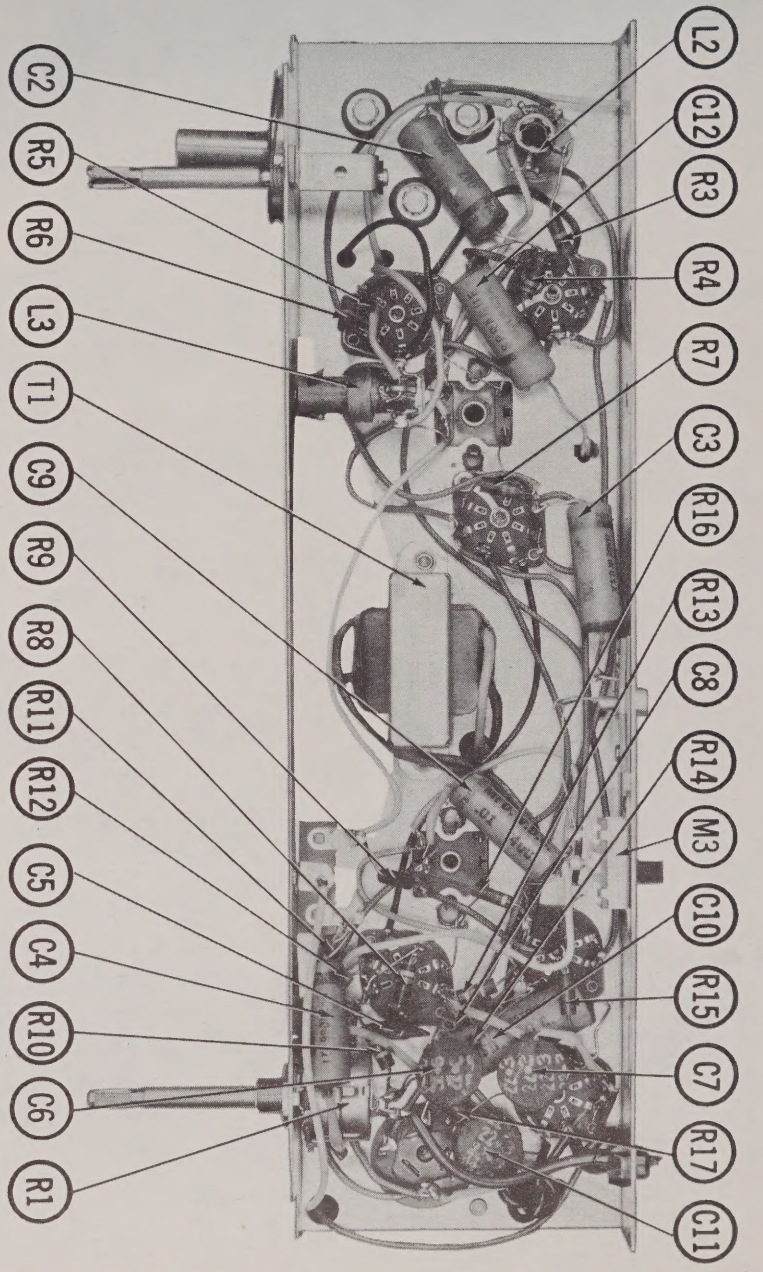
MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M1	Dial Light	100-89	#44 (Alternate-#1891)
M2	Tuning Gang	22-2902	3 Gang (15-350MMF, 20-220MMF, 17-90MMF)
M3	Switch	85-495	Radio-Phono, Slide Type (DPDT)
	Knob	46-1633	Volume, Tuning - Model Z615W
	Knob	46-1634	Volume, Tuning - Model Z615G
	Knob	46-1635	Volume, Tuning - Model Z615F
	Knob	46-1691	Volume, Tuning - Model Z615R
	Knob	46-1687	Tone - Model Z615W
	Knob	46-1688	Tone - Model Z615G
	Knob	46-1689	Tone - Model Z615F
	Knob	46-1690	Tone - Model Z615R
	Cabinet	14-2081	Model Z615W
	Cabinet	14-2082	Model Z615G
	Cabinet	14-2083	Model Z615F
	Cabinet	14-2142	Model Z615R

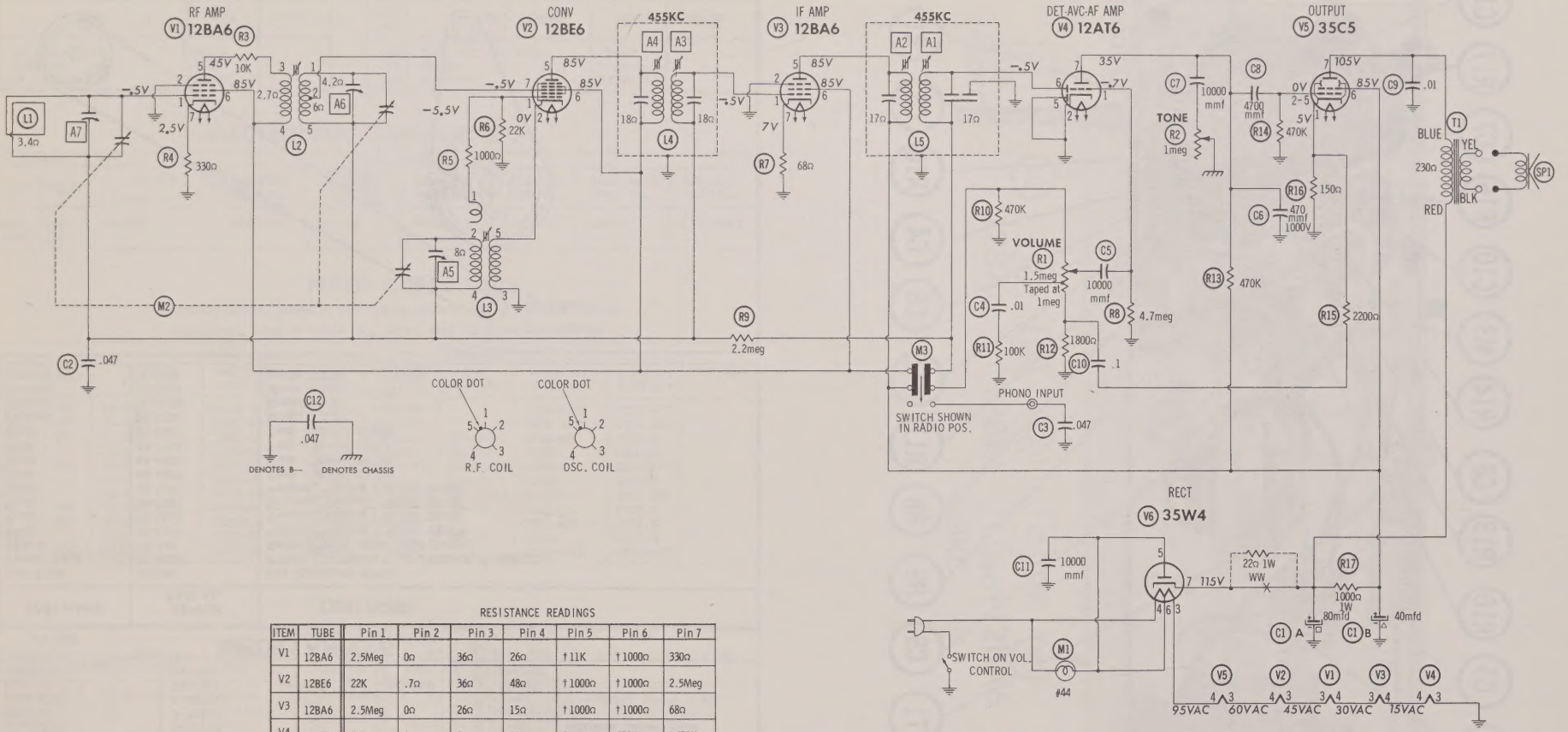


DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



ZENITH
MODEL Z615F (Ch. 6Z05)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BA6	2.5Meg	0Ω	36Ω	26Ω	†11K	†1000Ω	330Ω
V2	12BE6	22K	.7Ω	36Ω	48Ω	†1000Ω	†1000Ω	2.5Meg
V3	12BA6	2.5Meg	0Ω	26Ω	15Ω	†1000Ω	†1000Ω	68Ω
V4	12AT6	4.7Meg	0Ω	0Ω	15Ω	0Ω	470K	†470K
V5	35C5	150Ω	470K	48Ω	85Ω	470K	†1000Ω	†230Ω
V6	35W4	TP	TP	85Ω	115Ω	110Ω	110Ω	20K(Min)

ALL MEASUREMENTS TAKEN WITH RADIO-PHONO SWITCH IN "RADIO" POSITION
† MEASURED FROM PIN 7 OF V6
TP TIE POINT

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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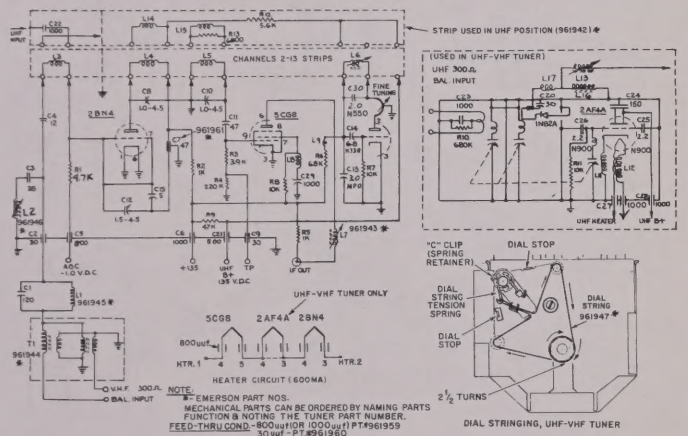
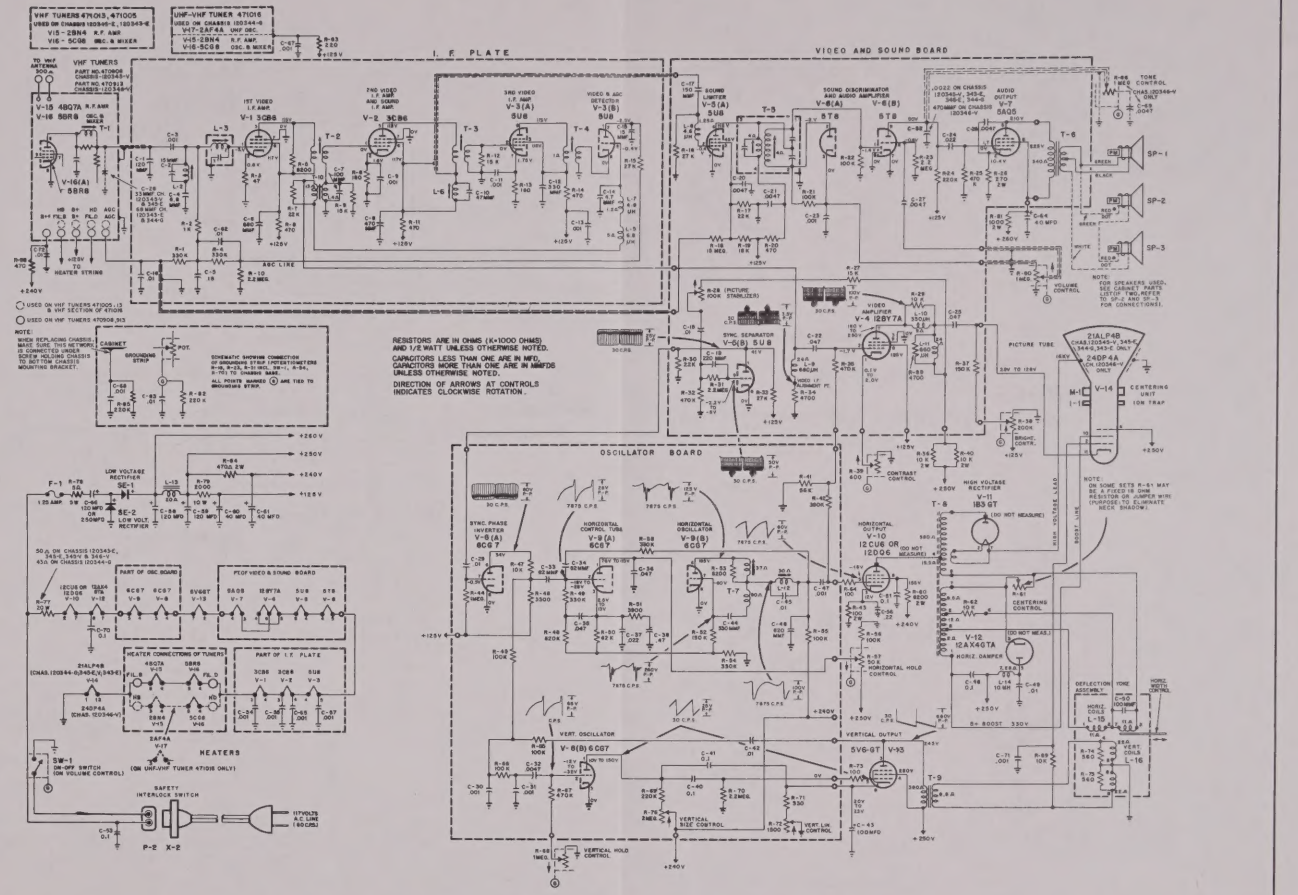
EMERSON MODELS	CHASSIS
2034S	120345E, V
2038S	"
2040S	120346V
2042S	"
2056	120343E
2057	120344G
2058	120343E
2059	120344G
2060	120343E
2061	120344G
2062	120343E
2063	120344G

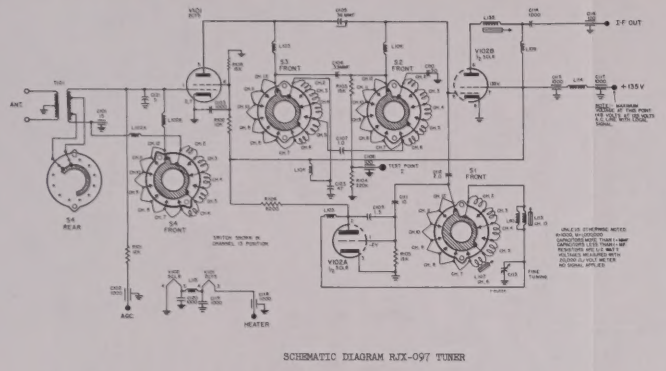


NOTE:
*- EMERSON PART NOS.
MECHANICAL PARTS CAN BE ORDERED BY NAMING PARTS FUNCTION & NOTING THE TUNER PART NUMBER.
FEED-THRU COND.- 800uuf(OR 1000uuf) PT.#961959
30uuf - PT.#961960

UHF-VHF TUNER PT. #471016, VHF TUNERS 471013, 471005


VHF TUNERS 471013, 471005
UHF-VHF TUNER 471016
I. F. PLATE
VIDEO AND SOUND BOARD
OSCILLATOR BOARD
RESISTORS ARE IN OHMS (K=1000 OHMS) AND 1/2 WATT UNLESS OTHERWISE NOTED.
CAPACITORS LESS THAN ONE ARE IN MFD.
CAPACITORS MORE THAN ONE ARE IN MMFDS UNLESS OTHERWISE NOTED.
DIRECTION OF ARROWS AT CONTROLS INDICATES CLOCKWISE ROTATION.
HEATERS
SAFETY INTERLOCK SWITCH
PICTURE TUBE

SCHEMATIC COURTESY OF EMERSON RADIO & PHONOGRAPH COMPANY



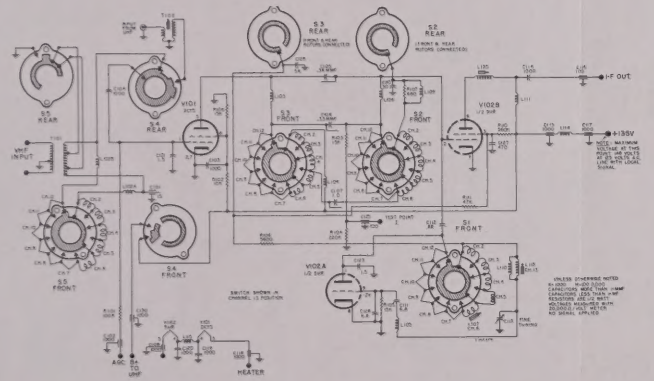
SCHEMATIC DIAGRAM RJX-097 TUNER

GENERAL ELECTRIC

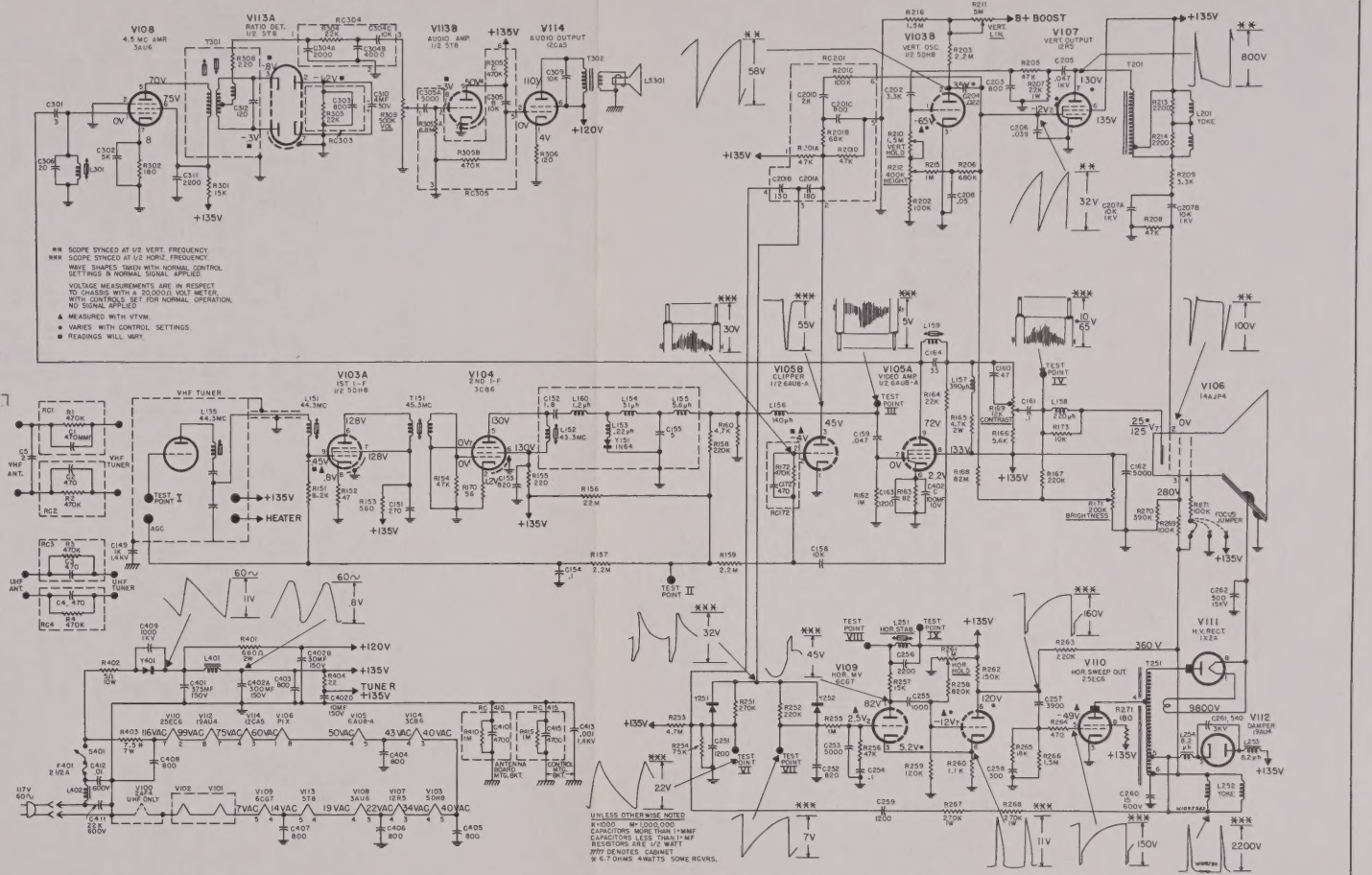
MODELS

14P1209 ("Q2" Line) 14P1211 ("Q2" Line)
14P1210 " 14P1212 "

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



SCHEMATIC DIAGRAM RJX-096 TUNER



SCHEMATIC COURTESY OF GENERAL ELECTRIC COMPANY

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